American Machinist

JANUARY 29, 1936

MACHINERY AS AN INVESTMENT

THIS IS the time of year for annual meetings and inventories, and large plans for the year ahead. To those readers of *American Machinist* who have an interest in such matters, officially or as plain stockholders, we put this question—How well is your investment, which is largely in machinery, being preserved?

If you don't know the answer to this question, isn't it a proper one to put to the management of the company in which you hold stock? One of the cardinal principles of business management is to maintain the integrity of the original investment in order that loss shall not come to the stockholders if it becomes necessary to liquidate the business.

Certain of the intangible assets of a going business may be difficult to evaluate, but machinery and machine tools are decidedly tangible, and they have a market value which depends largely upon their age and condition. It is not hard to arrive at a measure of this value.

In the first place the 1935 Inventory of Equipment in Metal-Working Plants, completed last April by *American Machinist,* is recent enough to offer an excellent yardstick of averages. In the second place this Review and Catalog number, with its abridged descriptions of 640 new pieces of equipment announced during the past year, and its advertisements of catalog type, gives in one place a complete picture of the most modern developments.

IT IS certainly fair to ask the management how its equipment compares with that of other plants. At the moment the average for the industry as a whole is so bad that any plant equipped with machinery worse than the average is hardly a safe investment for any man's money. An intelligent stockholder would be entirely justified in demanding of his directors that their executive head make sure that the new equipment described in these pages had been carefully studied by the men charged with machinery selection.

And he should also demand that his investment be protected by the replacement of worthless equipment with efficient modern units. To this end the financial management must find means to provide the production heads with the funds they need for new machines. That involves the proper use of depreciation reserves and the postponement of dividends until the depletion of reserves brought about by the depression has been made up. There can be no hope of future dividends unless the plant equipment is efficient.

Metal-Working Progress Dramatized by Show Spotlight

THE FULL import of what American machine tool builders have done to improve their products was strikingly revealed at the Machine Tool Show last September. Even though visitors to that exhibition were amazed by the power, speed, weight and equipment of 1935 models, they were quick to see the cost-reducing possibilities of the new machines as compared with their older equipment. A good indicator of their approval is the business index of the National Machine Tool Builders Association, which since September, 1935, has maintained an average double that for the same period of the previous year.

When the previous show was held in 1929, tungsten carbide was only in its infancy. Since then it has exerted a profound influence on machine tool design. It has not only emphasized the need for speed and power, but it has also directed attention as never before to the problems of convenient control and reduction in idle time. Builders in all lines have seen fit to make extensive experiments with the new parts, mechanisms and materials developed by specialists. As a result, they were able in 1935 to show thoroughly coordinated designs that completely outmoded equipment on view at the 1929 exhibition.

Figures gathered at the Show indicate that 1935 machines are from 25 to 50 per cent heavier than similar machines of five or six years back. They must be so to counteract any tendency to vibrate; to take the stresses imposed by heavier cutting loads; and to resist any strain or misalignment so that the much closer tolerances demanded by industry can be maintained in production. For example, automatics are now required to produce consistently to limits considered in the order of toolroom accuracy not so long ago.

By putting more metal in machine tool beds, frames, columns, headstocks, or whatever, the builders have gained not only greater stability under cut but also advantages in many other ways. They have found that box-form construction affords a means of carrying stresses down to the floor or foundation, and of inclosing motors, wiring, piping, controls, pumps and sumps for coolant, lubricant and hydraulic oil. Chip space is also much larger. The appearance of the machines is enhanced, and artisic reatment of the exterior has been employed as a means of trademarking machines.

So-called "ordinary" cast iron has lost favor as the most suitable material for castings. Alloyed irons or steels have more desirable fabricating and service characteristics. Many concerns still feel that scraped iron ways are the best, but there is an increasing use of hardened steel wearing strips.

CONVENIENT control is stressed in 1935 machines. Levers and handles are of the directional type, and these with handwheels, pushbuttons or other control media are concentrated within the comfortable working range of the operator. If more than one working station must be provided, the controls are duplicated entirely or in so far as practicable for the particular machine. Measuring dials on infeed and length-feed screws are truly that so that the machine operator need not lose time on gaging and checking, but can produce to close limits on repetition jobs.

Hydraulic feeds continue to gain in favor. Companies that have been cautious in marketing machines with such equipment have become convinced through much experimentation and development in their own shops that such feeds are entirely satisfactory. Other concerns that have made use of hydraulic equipment for some time have also made many detail refinements. Chucking, clamping and clutch operation are other functions to which hydraulic control devices have been applied.

Valves and control panels for hydraulic circuits have undergone intensive development. A single operating lever on the front of a machine will cause it to go through a complete cycle and stop, or repeat, after depressing one pushbutton to start the main electric motor. Resetting of the controls in order to change the machine cycle for other work is a simple operation. Pumps have been perfected to give constant volume or pressure. Hydraulic motors, although not so common as the pumps, find frequent application where infinitely variable spindle speeds are desirable. They can be controlled by the operator or by a cam timed with the machine so that the speed is increased over a definite range in proportion to reduction in diameter of the work.

Motors, switches, contactors and measuring relays especially adapted to

machine tool application have been given much consideration recently by various electrical manufacturers and have been taken up rapidly by the machine tool builders. Although these items have been under development and adaptation for many years, the interest in them lately has intensified because of a desire for multi-motor installations that do away with mechanical connections to several mechanisms, and also because it is realized that electrical aids permit wonders in obtaining semi-automatic or automatic cycles. Torque motors for opening and closing chucks and actuating other work-holding means, dynamic braking for quick spindle stops on production machines, electric clutches, and electric interlocks are a few of the recent innovations.

Interest in equipment offered for improved production is stimulated by increased industrial activity

MACHINE tool builders are proud of the extent that they apply anti-friction bearings. Practically all spindles are mounted in pre-loaded types, and other shafts throughout the machine are likewise equipped if the slightest advantage can be shown. Alloy steels are used for spindles, shafts, gears, cams, reciprocating members and many other parts. Other features are: ground and lapped gearing, oil filters, centralized lubrication, more accessible tooling zones, some welding although not as much as was predicted some few years ago, unit design so that special machines can be quickly and economically assembled and still permit changes when desired.

There are 640 items in this review of 1935 shop equipment. Of this number 355 relate to metal-working machines of which many were exhibited at the Show. The balance deals with accessory equipment, parts, mechanisms and materials.

Horizontal boring machines have either a high-speed and a low-speed spindle, or else a high range of spindle speeds as optional equipment. The purpose of these is to provide for small drilling, milling and boring operations at the same set-up. Quill-type heads are employed on a planer-type boring, drilling and milling machine, so that boring bars and cutters can be employed on the same heads. The boring bars slide in sleeves, and pass through the large cutters mounted on the face of the sleeves.

An imported jig-borer of unusually large size has been developed for direct production work as well as jig and fixture work. It incorporates a milling feed, and for this reason the measuring screws used on the smaller models have been superseded by an optical system for setting the machine to precision scales. A domestic jig borer, also of large size, has unusually large travel of the vertical spindle quill to allow for the boring of deep holes or holes in different planes without resetting the head. New precision boring machines, a type which has now been on the market for several years, are principally adapted for small lot production, for close center-to-center distances of holes, for work requiring grooving and facing as well as boring, and for finish boring of cylinder blocks. The last represents a distinct departure in cylinder finishing methods and does away with the reaming and rough honing ordinarily employed.

Considerable development has taken place in chucking machines. In one model all changes of feed and speed can be made under cutting loads. Electric chucking by means of a torque motor at the back end of the spindle is a new feature in another line. Still another company is now building a line of machines intended to use newer cutting materials on a range of parts from small castings or forgings to others up to 9 in. in diameter.

Large surface broaching machines for the automotive industry continue to show remarkable production and finish. Two of these new models are for work on blocks and the third for aluminum cylinder heads. A fourth exhibited at the Show was equipped with an indexing fixture and a set of broaches to finish a rough pierced hole in an automobile transmission countershaft forging. During the year another method of broaching was developed that is particularly applicable to internal and external surfaces of work machined in vertical turret lathes.

Hydraulic feeds were applied to

several new drilling machines, particularly the manufacturing types. The rapid approach and withdrawal of the drill is instrumental in securing higher production. Reversing motors instead of mechanical reversing clutches are also faster and allow trouble-free tapping.

Eight new drilling and tapping units show the interest of both machine tool builders and the metal working industry in general in the subject of unit type machines. These units are being used by builders on their own machines and are also being furnished to modernize installed equipment. They are quite evenly divided between the mechanical-feed, mechanical-drive type, and the hydraulic-feed, mechanical-drive type. They are suitable for mounting in various positions and are fitted with means for automatic cycles that can be varied at will.

HIGHER speed and improved finish on the work are claimed for a gear generator. Spiral bevel and hypoid pinions used by the automotive industry have called forth new designs for roughing and finishing machines. Except for cutter drive, all movements of the roughing machine are under hydraulic control. The finishing machine completes the operation in a single cycle, and is also hydraulic in nature. It embodies power chucking and stripping mechanisms built into the work spindle. Hobbing of the new taper spline is done on a machine in which the hob slide must move laterally as well as longitudinally. A tapered hob is used.

Requirements of the automotive industry are also responsible for an hourglass-worm shaper. In this machine the cutter rotates in mesh with the work and reciprocates at the same time that it is feeding into depth. In order to secure smooth finish, the work makes a complete revolution after the cutter has reached the full depth. To finish these worms satisfactorily, another maker is building a lapping machine in which the work runs on centers to eliminate costly adaptors. Timing of the lapping action is automatically controlled.

Other types of automotive gears are finished in a variety of new machines developed in 1935. Air-actuated collets hold any common type of gear on the workhead of a gear chamfering machine while the operation progresses at the high speed of 150 teeth per min. Various rounding, pointing, chamfering and burring operations are done on a group of hydraulically controlled machines. The shaving principle of finishing helical and spur gears has been extended to internal gears.

Increased use of carbide tools has stimulated the development of machines for grinding them. Silicon carbide or diamond bearing wheels are used, and one model includes a lapping wheel to be charged with diamond dust. One of the many new bench grinders has built-in lamps that illuminate both wheels. Another is designed solely to use up wheels that have been worn down to 7 in. diameter or less.

Two new thread grinders have come on the market recently, one of domestic manufacture, the other foreign. The domestic machine employs an 18-in. wheel and is guaranteed to hold a tolerance on the lead of not over 0.0002 in. per in. of length. This machine is motor driven and self contained. Drive of the imported machine is through a cone pulley mounted above it. It has an accuracy of plus or minus 0.0001 in. on lead-screw grinding, and is fitted with microscope and temperature corrector.

Machine timing characterizes two new models of cam grinders, thus permitting an operator to handle several machines. Hydraulic operation is used on both of these units. Loading time is reduced on a crankpin grinder by the use of a hydraulically operated steadyrest that clears the work automatically when moving from one pin to the next.

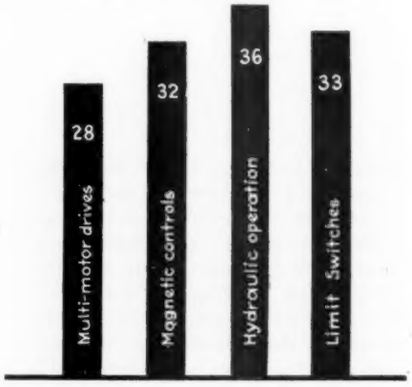
Hydraulic operation equalizes the action of four 14-in. grinding wheels used in a special machine for finishing circumferential welds on condenser drums. Another special is said to be the largest built. It was designed for grinding the races for unusually large taper roller bearings and looks like a three-head boring mill. Ten motors are needed for the various motions, and a hydraulic drive moves the vertical spindles. Adaptability is featured in a plunge-cut grinder which is essentially a special machine. The automatic cycle of the machine is operated hydraulically and controlled electrically.

A gap arrangement permits an internal grinder of ordinary size to handle pieces up to 38 in. in diam., and 15 in. long. Another internal with an automatic cycle uses air pressure at 65 to 80 lb. to carry the wheel slide in and out, and a crank traverse mechanism to smooth the wheel control on short jobs.

Surface grinders have reached a stage where they combine precision and considerable metal removing ability. Hydraulic and electric feeds and controls are in general use. One of these machines is equipped with built-in wattmeter. Tandem oil pumps are found on a rotary machine, the high pressure cylinder taking care of the chuck speeds, and the lower supplying pressure for the wheel slide. One large unit is equipped with revolving table which carries the work successively under three wheels thus subjecting it to rough, semi-finish and finish cuts in one revolution.

Lathe spindle speeds were stepped up materially during 1935, to 3,600 r.p.m. on several makes, to 5,000 r.p.m. on a manufacturing type unit. Turret lathes now run up to 3,600 and 3,800 r.p.m., screw machines to 3,400, 3,600 and 3,800. Two makes of engine lathes are using an infinitely variable friction drive, and several makers of engine lathes, automatic lathes and turret lathes are offering a standardized flange-type spindle nose as regular or optional equipment.

Product Engineering's *annual survey of design trends revealed how 59 machine tool builders are extending the use of parts and mechanisms. Each bar in the chart gives the number of concerns adopting the particular item, not the percentage of the group*



Turret lathe builders have substituted a single speed-selecting lever for the three or more levers that had to be shifted on the older models. Automatic lathes are adapted to faster loading and unloading and shorter intervals between cuts to take full advantage of the faster cutting speeds. Electrical and hydraulic controls are being applied wherever possible to the extent that very little physical effort is required of the operator, but a very considerable amount of alertness.

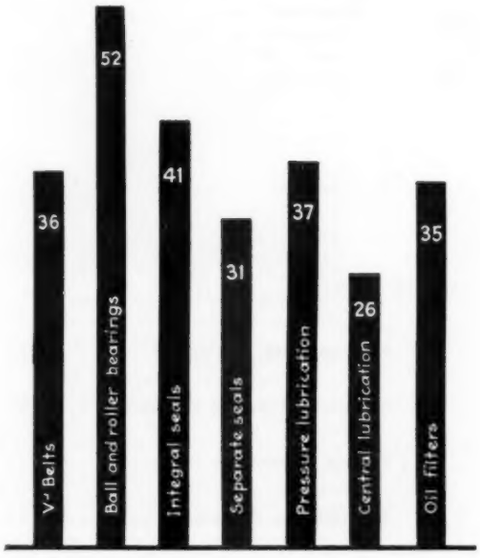
Base machines with various combinations of top units are being offered by several builders. V-belt drives are used on the higher speed models, as are directly mounted motors. Electric brakes are to be found on the production lathes where quick stopping is as important as quick starting. One lathe builder puts the change gears in the leg and drives the spindle through V-belts.

Three hydraulically operated friction clutches and two similarly operated

brakes, one at the primary power source and the other at the spindle to prevent overrun, and more clutches in the gear train provide another solution of the control problem.

Much sturdier bases are under most of the lathes. Some of them are built out so that there is no longer any overhang of the headstock. Others have the base completely boxed in so that they look totally unlike the older models.

Developments in milling machine design seem to be mostly at the two ends of the range, a few very large machines, and several more quite small ones. Spindle speeds are being stepped up, 2,000 r.p.m. being common and 2,600 available in at least one model. There has been a considerable advance in electrical control, particularly in the large planer-type machines where as many as 40 push buttons are in use on one machine.



Milling machines for laboratory and toolroom use with ability to handle small production runs of small parts have attracted the attention of the designers and most of the new models fall in this field. Hydraulic as well as electric control is being used, and V-belt drives have been applied to avoid vibration. In the strictly manufacturing machines much thought has been given to securing flexibility.

Planer builders went all the way in substituting electric control for hand motions. The present-day planer operator hardly has to move his feet once a job is set up, he controls everything from the pendant switch and the panel switches, all within easy reach. Two specialized models attracted attention at the Machine Tool Show, one demonstrating a simple and effective two-way cutting tool, and the other a combination of milling and planing heads that permit the performing of practically every operation on a machine base at one setting. To drive the various units individual motors are generally used; in fact, a large machine tool with only one motor is rarity today.

The high-speed shaper, made possible by the use of light metal in the ram, has regained some of the ground lost by the shaper to the milling machine. All of the shapers announced during the year had higher speed ranges, 200 strokes per min. being conventional now for a 16-in. machine.

Welded steel construction is gaining ground in the power press field but there are still plenty of advocates of the cast frame design. At a rough guess the two groups are about equal in size at the present time. New models of hydraulic presses are faster than the old ones and correspondingly more attractive from the production point of view.

Greater efficiency, faster and stabilized arc, preset current control and self-adjusted voltage are features of welding sets developed during the year. These machines have extended current ranges to suit thin gage and heavy welding, and they have characteristics that enable use of coated and bare electrodes. The electrode materials include one for depositing the equivalent of high-speed tool steel, and a second for hard surfacing of carbon steel, low alloy or high manganese steel to resist abrasion. Columbian-treated 18-8 welding rod overcomes the problem of impaired corrosion resistance of stainless steel after heat-treatment because of segregation of carbon at the grain boundaries. Welds fabricated with the rod have full corrosion resistance and heat resistance in the "as welded" condition.

In the section "Other Machines" there are many new developments of direct interest to the shop executive. Here are placed the condensed descriptions of equipment for which there are not enough items to make a separate classification. But when summed up it is an important section, where improvements are to be found in as large measure as in the other parts of the review number.

The first sub-group in the above classification deals with band-sawing and die filing machines. Such machines attracted a good deal of attention at the Show because of their ability to handle intricate contours. One of these machines has the saw band wound on a drum. The band, 150 ft. long, will give three minutes of sawing at the lowest cutting speed, and the band can be returned to its original position in 18 sec. Other machines are supplied with a small electric brazing machine so that the ends of the saw blade can be fastened together. An automatic feeding device on one machine releases the operator to concentrate on guiding the sawing operation.

BUFFING and polishing machines have been offered with greatly extended spindles so that awkward large work like fenders can be handled. Drives are arranged so that the replacement of V-belts or speed changes can be made without opening the bearing housing or disturbing the motor. Abrasive cutting-off machines either supply coolant to the disk or have long water troughs in which the work lies and is moved to the wheel. One of these machines has been adapted to making long cuts through flat or slab stock.

Complete hydraulic operation of a large die-casting machine is secured from one pump. An electric time-delay switch regulates the solidification period, eliminating guesswork on the part of the operator. When improving its drop hammer, another company made use of a high-strength, wear-resisting alloy iron that it had developed. An improved valve and cylinder of this material are proportioned to secure higher effective pressure, a shorter idling strike and elimination of valve leakage.

Forging presses and rolls have been extensively improved. In one forging press for hot and cold work, the main shaft is of the full eccentric type, and the ram will withstand loads off center. Fine die adjustments can be made without shimming. In the "wide adjustment" forging rolls, the semi-cylindrical dies can be adjusted through a distance five times as great as formerly.

What is probably the largest machine of its type has been built to bend, flange, form and multiple-punch steel plates up to 2 in. thick and 12 ft. long. Several electrical control stations permit the operator to work at the most convenient position. High-speed helve hammers have been adapted to flattening trimmed butt welds on automotive body sheets, and for assembly of small units such as clock frames by spinning all rivet heads in one operation. One of the most interesting machines at the Show was the "silent riveter." It consists of a separate gun head connected to a hydraulic power source by means of hydraulic hose. Control is at the riveter yoke. The pressure at the dies is 35,000 lb.

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BORING AND TURNING MACHINES

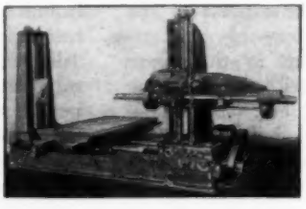
Boring Machines, Horizontal

Universal Boring Machine Co., Hudson, Mass. (Vol.79, p.659.)

The No. 440 machine has a 4-in. main spindle, and the No. 450, illustrated, has a 5-in. spindle. The latter has spindle speeds from 8 to 300 r.p.m. in the low range and 7 to 850 r.p.m. in the high range. Traverse of the spindle with one resetting is 72 in.; maximum distance from faceplate to outer support is 84 in.; distance from the top of the table to the center of the spindle is 48 in.; working surface of the table is 36x72 in.; power cross feed of the table is 60 in.

The No. 440 machine is approximately the same size but may be equipped with a high-speed range of 8.3 to 1,000 r.p.m.

The high spindle-speed range available to the main spindle of both machines provides a range of speed suitable for small drilling, milling and boring operations, and for the application of cemented-carbide tools.



Boring, Drilling and Milling Machine, Horizontal

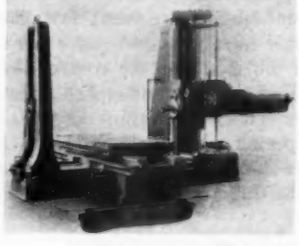
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis. (Vol.79,p.666.)

On this No. 350-T machine milling and drilling operations are not secondary to boring, but all three are performed with equal efficiency. A floor-type No. 350-FQ machine is similar, the main difference being a flange motor mounted directly on the head. This machine has an adjustable quill with sliding spindle.

Boring and heavy milling are performed with the large main spindle running at speeds up to 375 r.p.m. High-speed drilling, tapping and milling work is carried out on the small, sensitive high-speed spindle which reverses at 1,500 r.p.m.

Operation of the table, saddle and headstock is entirely independent. Thus, the operator can follow an irregular outline, using power feed to the table and headstock. Irregular outline can also be routed out or face milled with a vertical milling attachment.

Diameter of main spindle, 5 in.; table surface, 36x72 in.; height of spindle above table, 48 in. maximum.

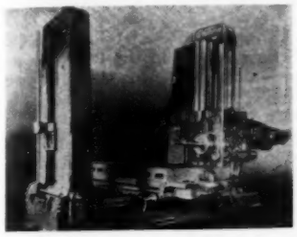


Boring, Drilling and Milling Machine, Horizontal

Bryant Machinery & Engrg. Co., Chicago, Ill. (Vol.79, p.693.)

The 5-in. and 6-in. spindle Dreadnaught table-type horizontal boring, drilling and milling machines are built by the Ohio Machine Tool Co., Kenton Ohio, and distributed by the above concern. The illustration shows a 6-in. spindle machine with 72-in. vertical travel of the spindle head, 48 by 100-in. table, 60-in. wide by 120-in. long bed.

Among important changes is



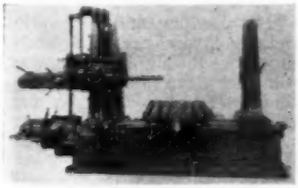
the movement of the precision rod measuring attachment from the rear to the front of the head and the front of the table. Also, the handwheel for hand feed to the spindle and other units has been brought to the extreme front of the machine.

The hand movement to the table and table saddle, the clamping of the table to the saddle, and the saddle to the bed, have been brought to the front part of the saddle, adjacent to the operator's position. The boring bar support bearing can be clamped from the floor regardless of its vertical position.

Boring Machines, Horizontal, Nos. 41, 42, 43 and 53

Lucas Machine Tool Co., Cleveland, Ohio. (Vol.79, p.703.)

By means of the new auxiliary "Hi-Speed" drive incorporated in the "Precision" horizontal boring, drilling and milling machine, speeds up to 1,200 r.p.m., 1,000 r.p.m. and 860 r.p.m. are made available in the several size machines to the 3, 4, and 5 in. diameter main spindles, respectively. The rigidity of these main spindles permits their being extended a considerable distance, to reach recessed or offset surfaces with an end-milling cutter, and accordingly the high speeds are not limited to mere drilling.



The auxiliary Hi-Speed final drive to the spindle is by multiple V-belts, avoiding gear-tooth vibrations so detrimental to the cutting edges of cemented-carbide cutters. The single-spindle construction for both high and low speeds avoids complication in indexing for accurate center distance between small and large holes bored one above another.

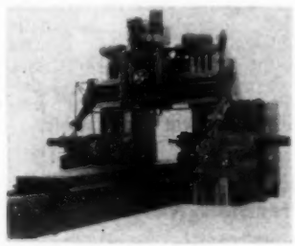
The illustration shows a 3-in. spindle No. 41 machine with auxiliary Hi-Speed drive and other special features, including the dial-indicator indexing device, employing special length gages corresponding to exact distances vertically and horizontally between centers of holes to be bored in repetition work, or combinations of standard end measures and inside micrometers for original work. The dial indicators insure uniform contact, without danger of springing and consequent error in indexing.

Boring, Drilling and Milling Machine, Planer-Type

Giddings and Lewis Machine Tool Co., Fond du Lac, Wis. (Vol.79,p.338.)

Quill-type heads, which include a boring bar with hand and power feeds, are the outstanding feature of this high-power, precision, horizontal boring, drilling and milling machine. The quill in the heads is adjustable by hand and also has eighteen independent power feeds. Milling cutters 8-in. and larger may be mounted on the spindle sleeve and left there because the spindle is free to pass through the cutter.

Directional controls are provided for the heads and the table, enabling the operator to



follow an irregular outline. In all, 324 combinations can be directly engaged, sloping up and sloping down.

The table is provided with two sets of scales and verniers, one on each side, and each headstock is equipped with an individual vernier and separate scales if necessary. The two planer-type cross rail clamps are operated simultaneously from either side of the machine. A three-head machine is shown with duplex controls. Not all combinations permit such an arrangement and for certain classes of work complete duplex control is not desirable.

Boring and Reaming Machine, Vertical, Multiple-Spindle

Baker Bros., Toledo, Ohio. (Vol.79,p.341.)

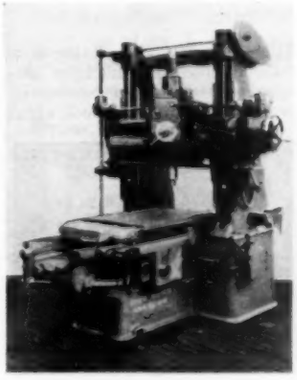
This vertical hydraulic feed machine of simplified drive is designed for second boring and reaming of valve guide holes, and finish boring valve throats and chamfering the valve seats on a six-cylinder block. The cycle is automatic, allowing for one or two feeds with a positive stop and delayed reverse. The head is arranged with 24 spindles, a front row of twelve spindles, which carry the final reaming and chamfering tools, and a rear row for the twelve guide and valve throats. Production on this machine is 30 blocks per hour.

Boring and Milling Machine, Jig

Triplex Machine Tool Corp., 125 Barclay St., New York, N. Y. (Vol.79,p.280.)

This Société Genevoise "Hydroptic" Size A machine is specially designed for direct production work as well as for the manufacture of jigs and fixtures. Precision scales are read by microscopes (the machine is too large for precision leadscrews as in other Swiss jig borers).

The table has a working surface of 27¾x39½ in. Traverse of

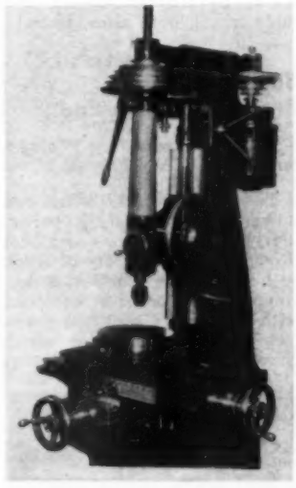


the table is effected by hydraulic power. The cross-rail is adjustable vertically on the columns by power. Vertical traverse of the rail is 20 in. Maximum traverse of the spindle is 10 in., and the six rates of power feed are from 0.0016 to 0.001 in. in both directions. The eighteen spindle speeds range from 40 to 1,250 r.p.m. The machine has a capacity for drilling from 0.1 to 1.75 in. in cast iron. Diameters from 0.5 to 9 in. can be bored with adjustable tools.

Boring Machine, Jig

Moore Special Tool Co., 52 Remer St., Bridgeport, Conn. (Vol.79,p.441.)

Increase in the size of the column and slides provides greater rigidity and accommodation for larger bearings. Power feed has been added to



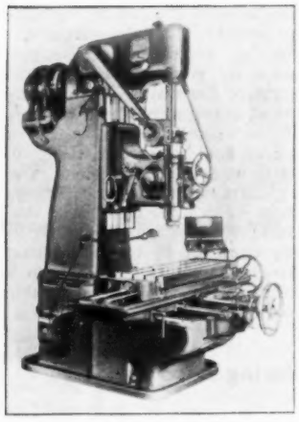
the spindle. Five spindle speeds ranging from 190 to 2,000 r.p.m. are available. Maximum boring capacity in tool steel is 1½ in.; in mild steel 2 in. Table working surface, 10x16 in.

Boring Machine, Jig

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.599.)

The No. 2-A is available in two sizes, known as the No. 2430 and No. 3644. The two machines differ only in table size and work range. Twelve spindle speeds ranging from 37 to 1,800 r.p.m. Eight power feeds are provided in either direction for any spindle speed. A 9-in. vertical travel of the spindle quill makes possible boring deep holes, or holes in different planes, without having to reset the spindle head.

Graduations on the front of the quill and the depth-dial indicator provide for accurate deep boring. The table is traversed rapidly in both directions by double-threaded screws. Holes are located by two di-



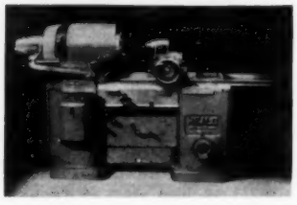
mensions at right angles, using the two built-in measuring devices.

Specifications of the No. 2430 and No. 3644 machines, respectively, are as follows: work table surface, 16x30-in. and 22x44-in.; longitudinal table travel, 24 and 36 in.; traverse table travel, both sizes, 18 in.

Boring Machine, Precision, Single-End

Heald Machine Co., Worcester, Mass. (Vol.79,p.802.)

The Style No. 49 single-end universal Bore-Matic is particularly suitable for small-lot production of a variety of work such as may be found in a machine tool shop. It is equipped with a manually operated drawbar operating unit, by which chucks and collets can be actu-

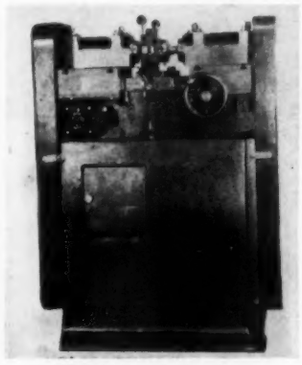


ated when they are used with the flange-type spindle workheads. A manually operated cross-slide is mounted on the table for either work fixtures or toolholders. With this arrangement the work may be held in a rotating chuck or a stationary fixture on the table, and the cutting tool may be of either the rotating or stationary type.

Boring Machine, Precision, Double-End

Stokerunit Corp., 5325 W. Rogers St., Milwaukee, Wis. (Vol.79,p.29.)

The machine has a bridge at both ends so that the boring of holes can be done when the center-to-center distance is too small to permit the use of two heads on the same bridge. A separate motor is used for each spindle and there is a reversible motor for actuating the table. The table moves the



work to each spindle in turn and is controlled by an automatic feed system.

Boring Machine, Precision, Double-End

Automatic Machine Co., Bridgeport, Conn. (Vol.79, p.377.)

The Coulter Type C boring machine is intended for boring precision holes in all kinds of material and in unlimited variety of sizes or shapes. Table feed and revolving of the spindles are accomplished from one hydraulic unit. The cycle of the

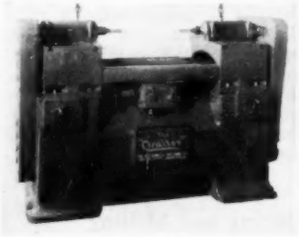


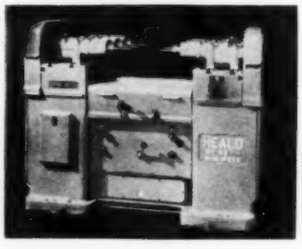
table is completely automatic and can be altered for length of stroke, rapid advance and traverse, and also for length of feed stroke for either end. The hydraulic motor for each spindle eliminates clutches, brakes and drive shafts. An infinite number of speed changes from 200 to 2,000 r.p.m., or from 400 to 4,000 r.p.m. are available.

Weight, 7,000 lb.; floor space, 68x30 in.

Boring Machine, Precision, Double-End

Heald Machine Co., Worcester, Mass. (Vol.79,p.642.)

The No. 49 Bore-Matic is a small double-end machine designed for precision boring of several operations in individual



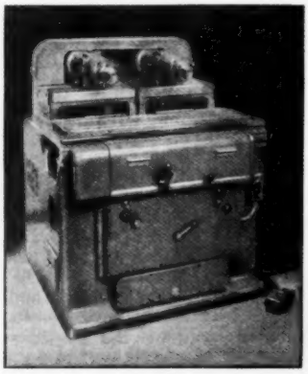
parts from opposite ends, or a number of different pieces that can be handled at a single setting. It has capacity for four small-sized boring heads at each end of the machine.

Boring speeds can be easily varied from 360 to 3,270 r.p.m., the distance between the bridges on the No. 49 is 28 in.; the standard maximum table travel is 12 in.; the boring stroke between both ends on the standard machine, with 28 in. between bridges, is 11 in.; diameter of the hole bored 6⅛ in.; minimum diameter of hole bored, ¾ in.

Boring Machine, Precision, No. 44

Heald Machine Co., Worcester, Mass. (Vol.79,p.802.)

The No. 44 is different from other Heald Bore-Matics in that the boring heads are at right angles to the table travel. Although designed particularly for facing and grooving operations, it may be adapted to



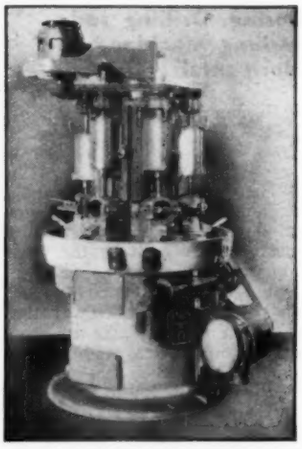
various arrangements of work where the surfaces to be bored are not parallel to each other. The machine may be furnished with completely automatic tables. With automatic control of the table in both directions, it is possible to perform a different set of operations with each movement of the table.

Boring Machine, Precision, Vertical

Automatic Machine Co., Bridgeport, Conn. (Vol.79, p.772.)

Type B-131 is a vertical, six-station, revolving, turret-type diamond-tool boring machine designed for large-quantity machining of bearing holes in connecting rods, pistons, bushings, valves, refrigerator units, motor end shields, magneto housings and similar parts.

Power is taken from the spindle motor by means of V-belts contacting all boring-spindle sheaves. As the turret revolves, the sheaves leaving the finished-work position gradually move out of contact with the V-belts, and are stopped by

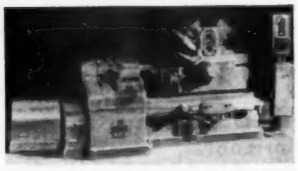


cam-operated friction brakes. Spindles leaving the loading position start to revolve before they reach the first boring position. Spindles are splined to permit the rise and fall of the spindle head, a movement which is controlled by the feed cam.

Boring Machine, Precision, Cylinder Block

Heald Machine Co., Worcester, Mass. (Vol.79,p.641.)

The No. 45 "Bore-Matic" precision boring machine is intended for "borizing" precision holes in large and heavy, irregular-shaped work of various kinds. The machine illustrated has been developed for borizing cylinder bores in a V-8 cylinder



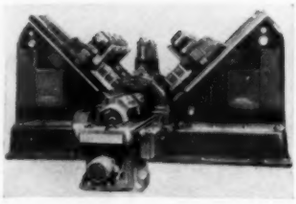
block. Four bores on one side of the block are finished in one pass, and after the block is placed in the reverse position in the fixture, the four bores on the opposite side of the block are "borized". The No. 45 Bore-Matic has a reciprocating table and a stationary bridge for the boring heads. The bridge provides for as many as seven boring heads. Specifications: Maximum diameter of hole bored, 9 in.; minimum diameter of hole, ¾ in.

Boring Machine, Precision, Cylinder Block

W. F. & John Barnes Co., Rockford, Ill. (Vol.79,p.682.)

This machine and its workholding fixture are completely automatic throughout. It was built for final-finish, single-point boring of Ford blocks and does away with the reaming and rough honing ordinarily employed.

Two cylinder blocks are

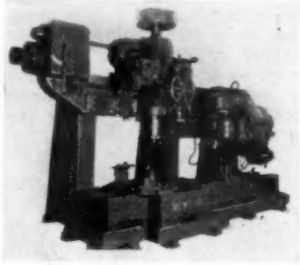


drawn into the fixture from the loading station by an hydraulically operated pull-bar which also unloads the fixture after the boring operation. Slides carry four boring units, each driven by V-belts. Because of the close center distance of the bores the bars bore alternate holes in both blocks at each operation. All cylinder bores are held to 0.0002 in. limit for size.

Boring and Milling Machine, Special

Consolidated Machine Tool Corp., Rochester, N. Y. (Vol. 79,p.27.)

A special combination boring and milling machine has been built for boring and milling the large and small openings in large connecting rods and similar work. An adjustable unit-milling head on the right side is

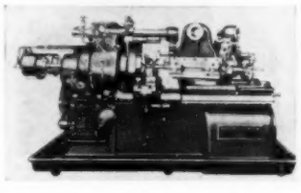


used for milling the rectangular opening in the small end of the rod. The large end is bored and faced with the large boring head. The milling head is mounted on an arm to provide in and out feed at right angles to the cross-rail. It also has lateral feed travel.

Chucking and Turning Machine, Two-Spindle

Potter & Johnston Machine Co., Pawtucket, R. I. (Vol. 79,p.304.)

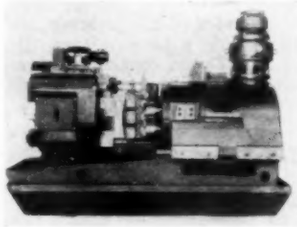
Two-spindle, Model 5-D "Power-Flex" automatic chucking and turning machine—specifications: Distance between centers of spindles, 15½ in.; swing over cross-slide, 13½ in.; travel of cross-slide, straddle cut—each way, 2¼ in.; with 10 in. diameter work, straight single tool facing—each way, 4¼ in.; number of turret faces, 5; distance from center of turret hole to top of turret slide, 5½ in.; total turret slide travel, 11⅛ in.; turret feed, 11 in.; cross-slide adjustment, 9¾ in.; diameter of hole through the spindle, 1 13/16 in. There are 28 changes of speed between 19 and 613 r.p.m. There are 24 feeds arranged in geometric progression.



Chucking Machine, Five-Spindle

Goss & DeLeeuw Machine Co., New Britain, Conn. (Vol. 79,p.663.)

The spindles are driven by a 10-, 15- or 20-hp. motor. Each spindle is equipped with a positive-jaw clutch. During the indexing cycle, the spindle-drive motor is stopped. This permits



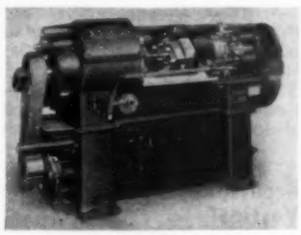
engaging of clutches without noise or shock. Three heavy-duty cross-slides are provided in the second, third and fourth spindle positions and are located at the rear of the machine. Electric chucking is provided by means of a reversing torque motor. Each of the three cross-slides is operated direct by means of an individual hardened steel cam.

Maximum swing, 8 in.; maximum travel of the main tool-slide, 6¾ in.; maximum travel of cross-slide, 6¼ in. Production cycle, 15 to 600 pieces per hour. Weight, 20,000 lb.

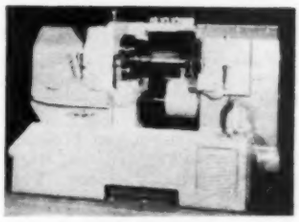
Chucking Machines, No. 12A, Model 14, No. 16 and No. 38

New Britain-Gridley Machine Co., New Britain, Conn. (Vol. 79,p.644.)

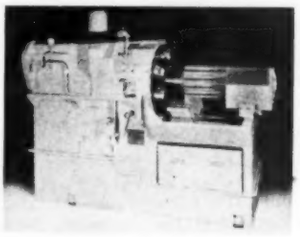
Four chucking machines were introduced at the Show. The No. 12-A machine is a three-spindle, tool-rotating type. It offers the rigidity, spindle speeds and accuracy necessary to utilize modern cutting materials. Spindles are provided with independent speeds and feeds so that the correct cutting speed and feed may be secured for each tool. The machine is adapted for the finishing of small brass parts from castings or forgings, such as brake fittings, gas, and oil-line parts.



No. 12A three-spindle



Model 14 four-spindle



No. 16 six-spindle

No. 38 single-spindle

Model 14 is a four-spindle, work-rotating type in which the chucks have a capacity of 6¾ in., and are hydraulically operated. The wide range of spindle speeds is suitable for modern cutting materials. Cross-slides are mounted on hardened and ground cylindrical steel studs. Auxiliary slides for carrying tools independent of the main tool-slide can be applied in the two upper positions.

The No. 16 machine is a heavy-duty, six-spindle work-rotating type. It is primarily designed for boring, turning, facing and forming operations on parts up to and including 9 in. in diameter. Forming arms, two in number, have large diameter circular-section bearings and are actuated by individual cams. Chucks are 9 in. in diameter and can be of the two- or three-jaw type.

The No. 38 single-spindle, heavy-duty, work-rotating machine is designed for the finishing of rings such as inner and outer bearing races, ring gears and similar parts from forgings or tubing. Boring, turning and facing tools are carried in arms which are supported on circular-section steel slides. These slides can be operated longitudinally for turning and boring, or transversely for forming and facing operations, and they can be cammed to synchronize the movements to suit individual jobs. A stock-feeding attachment can be applied so that tubing up to 5¼ in. in diameter can be machined.

Chucking Machine, Automatic, No. 7-D

Potter & Johnston Machine Co., Pawtucket, R. I. (Vol. 79,p.664.)

There are twenty changes of speed between 11 and 248 r.p.m. in the No. 7-D automatic chucking and turning machine. These speeds are arranged in five sets of four automatic changes. Feed gearing is driven from the spindle. There are 24 feeds in geometric progression from 0.007 to 0.250 in. per revolution. These feeds are in three groups. Five turret faces are provided for the mounting of tools. Feeds are independent of the high constant speed for idle movements of the turret slide.

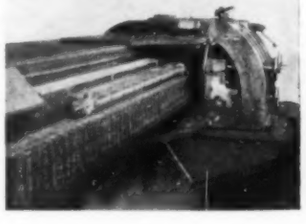
Swing over bed, 36½ in.; over cross-slide, 23 in.; travel of cross-slide each way, 8½ in.; total turret slide travel, 28 in.; turret feed, 13 in.; diameter of hole through spindle, 5¼ in.

BROACHING MACHINES

Broaching Machine, Horizontal

Cincinnati Milling Machine Co., Cincinnati, Ohio. (Vol.79, p.337.)

A large automobile manufacturer has been furnished this special horizontal surface broaching machine, for broaching and manifold-joint face, valve-chamber cover pad, fuel-pump pad, and a long narrow pad immediately below the valve



chamber, on a six-cylinder block. A bar guides the cylinder block into the tunnel-type fixture. The ram control lever and the positioning lever are hydraulically interlocked. Broaching speed 25.2 f.p.m.; stock removal 0.200 in.; time per piece, 0.84 min.; production 55 pcs. per 48-min. hr.; total area broached, 37.6 sq.in.

Broaching Machine, Cylinder-Block, Automatic

American Broach & Machine Co., Ann Arbor, Mich. (Vol. 79,p.568.)

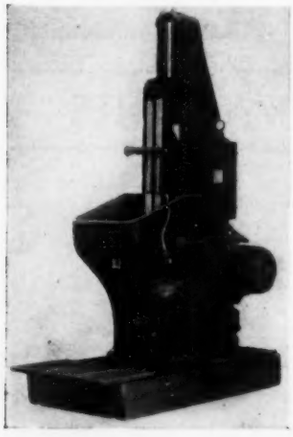
This automatic machine broaches the eight locating spots on top of the cylinder block of a V-8 engine. These surfaces are approximately 1¼-in. square. The machine consists of two cylinders operating in slides

above the position at which the work is broached, making it a tunnel-type broaching machine. These two cylinders move as a single unit. A small hydraulic cylinder moves a block up to the proper position in the fixture.

Broaching Machine, Surface, Vertical

Foote-Burt Co., Cleveland, Ohio. (Vol.79,p.305.)

Only the fixture and broach holder need be changed on this line of single-slide broaching machines for quick changes from the manufacture of one part to another. Cutting stroke of the broach is adjustable for length. High production can be obtained on small parts with limited surface area by stacking two or three pieces in a fixture and using one broach, or by placing the pieces side by side and using two or three broaches side by side.



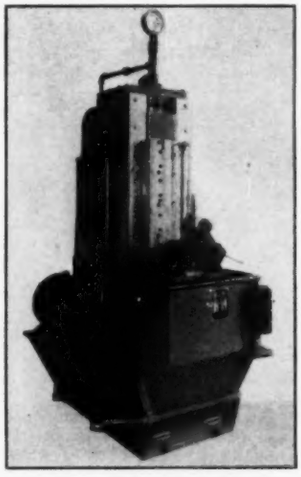
Work-holding fixtures are mounted on a sliding table which moves to and from the broach on hardened steel ways. The No. 22 has a capacity of 5 tons and the No. 23 a capacity of 10 tons.

Broaching Machines, Vertical

American Broach & Machine Co., Ann Arbor, Mich. (Vol.79,p.736.)

Built for pulling the broaches either upward or downward, the V-42 semi-automatic vertical broaching machine eliminates handling of the broaches by the operator. All that is required by the operator is to place the work over the shank of the broach and start the machine. It is possible to operate as many as eight broaches at one time. The maximum length of broach that can be used is 42 in., and the largest diameter of work the machine will receive is 13 in.

The SB-18 hydraulic surface broaching machine is equipped with a tilting work-holding fixture. Upon starting the machine the fixture automatically closes, and the broaches pass



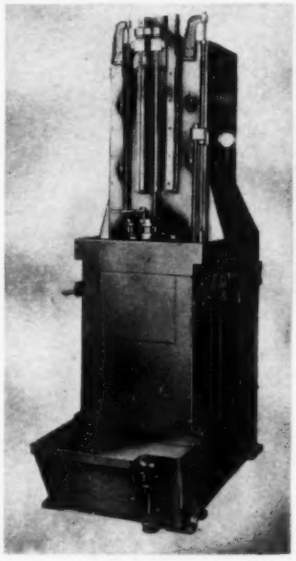
down on the cutting stroke. The fixture opens for the operator to unload and load while the broach is returning to its up position.

This machine is designed for broaching flat or concave surfaces, racks, ratchets, cams, opposing surfaces and slots. Maximum length of broach used is 18 in.

Broaching Machine, Vertical, Hydraulic

LaPointe Machine Tool Co., Hudson, Mass. (Vol.79,p.806.)

Being designed to pull the broach through the work, the vertical broaching machine sets up no difficulty in getting an ample supply of coolant to the cutting edge of the broach teeth. It also simplifies fixture

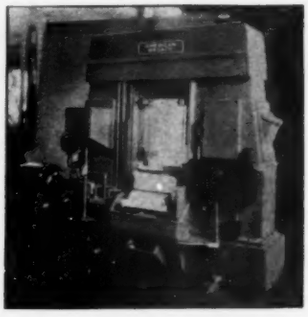


mounting and the handling of work. Both pedal and lever are provided for operating the broach lift slide. Lever only is provided for operating the main slide. Three sizes: 10-, 15- and 25-ton capacities. Maximum over-all length of broach ranges from 42 to 60 in.

Broaching Machine

American Broach & Machine Co., Ann Arbor, Mich. (Vol. 79,p.870.)

Designed for broaching elongated holes in aluminum cylinder heads used in a V-8 engine, this vertical continuous machine is of the push-broach type. Four holes are broached at one time, and two pieces are completed every 14 sec. Table is the revolving type, hexagon shaped. Two cylinder heads are mounted on the side next to the operator, as the

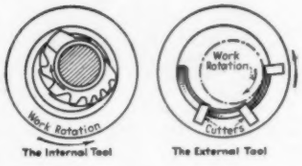


two top members are being broached. Upon completion of the broaching cycle, the drum-type table indexes automatically, discharging the two previously broached heads. The stroke of the machine is 24 in.

Broaching Method, "Roto-Broach"

Bullard Co., Bridgeport, Conn. (Vol.79,p.774.)

"Roto-Broaching" is the subjecting of the work, while rotating at cutting speeds, to the action of the tool, the blade edge, or edges, of which are arranged to approach the work surface at an angle with respect to the axis of the work and at a relatively low speed. Thus, the cutting action passes along the blade from point to point axially of the work. In this way, no one point of the blade is subjected to a continuous heat for an excessive time interval.



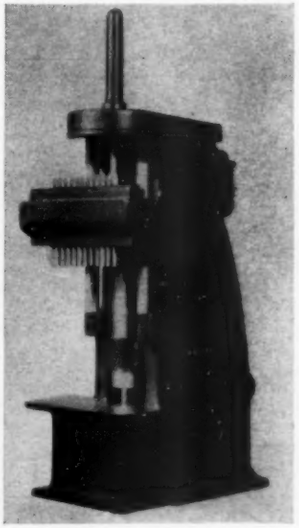
DRILLING MACHINES

Drilling and Boring Machine, Vertical, Hydraulic

Moline Tool Co., Moline, Ill. (Vol.79,p.439.)

The continuous spiral drive has been retained on the cylindrical-guide, hydraulic-feed drilling and boring machine, but the spiral is made much larger and is hollow, being supported internally on ball bearings. The advantage of the larger diameter spiral is better tooth contact between the driving and the driven gears. The fit of the spindle units or heads on the rail is changed to beveled clamping surfaces, so that the heads are drawn squarely on the rail.

This machine is provided with cylindrical hardened ways. The hydraulic cylinder has a

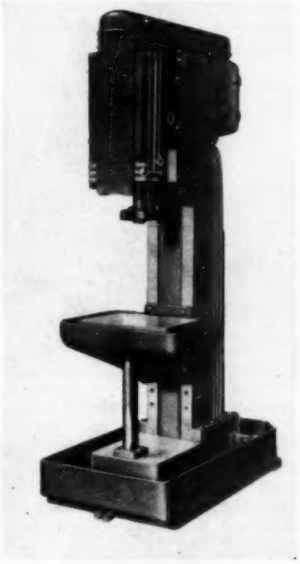


flange connection to the lower side of the rail. A hollow stationary piston rod is used and a separate motor drives the hydraulic pump for the feed. Spindles can be adjusted out to a maximum center distance of 36 in. Weight, 12,000 lb.

Drilling Machine, Vertical, Hydraulic

Ex-Cell-O Aircraft & Tool Co., Detroit, Mich. (Vol.79, p.648.)

The vertical hydraulic drilling machine with a maximum stroke of either 8 or 10 in. is a single-purpose, heavy-duty manufacturing type. Rapid traverse, feeds, reverse and stop are controlled by adjustable

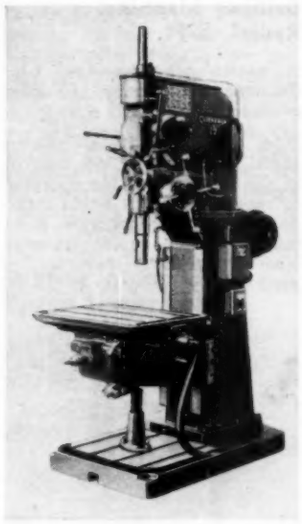


dogs. Two forward feed rates are independently adjustable. A flange is located on the end of the quill for mounting multiple-spindle heads. Push-button control for operating the electrical motors and the operating lever on the hydraulic power unit are located within easy reach of the operator.

Drilling Machine, Vertical

Bryant Machinery & Engrg. Co., Chicago, Ill. (Vol.79,p.710.)

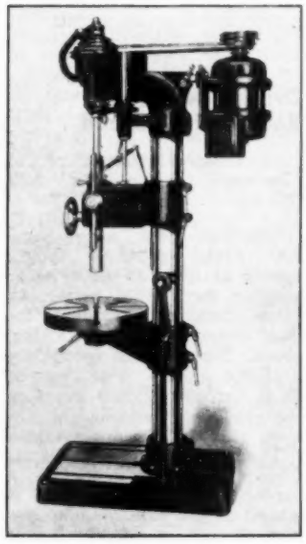
The C-1½ and C-2 upright drilling machines are built by the Cleereman Machine Tool Co., Green Bay, Wis., and distributed nationally by the above concern. The units are completely geared with positive speeds, and an automatic pressure oiling system lubricates the gearing and the anti-friction bearings. The C-1½ machine has a capacity of 1½ in. in SAE 1035 steel and is made in the following sizes: 20, 22, 24 and 28-in. The C-2 machine has a 2-in. capacity in SAE 1035 steel and is made in 24 and 28-in. sizes.



Drilling Machine, Vertical, No. 22

Buffalo Forge Co., Buffalo, N. Y. (Vol.79,p.735.)

A production tool that may be readily changed between jobs, the "Buffalo" No. 22 drill is made safer for operation because the backgears and direct-drive clutch are interlocked and



moved by one lever. Shifting may be done while the tool is running idle or at moderate speeds. Eight speeds are in geometrical progression from 65 to 1,350 r.p.m. This speed range provides for efficient use of drills from 3/16 to 2 in., and for tapping and spot facing.

Drilling Machine, Vertical, Hydraulic

Leland-Gifford Co., Worcester, Mass. (Vol.79,p.776.)

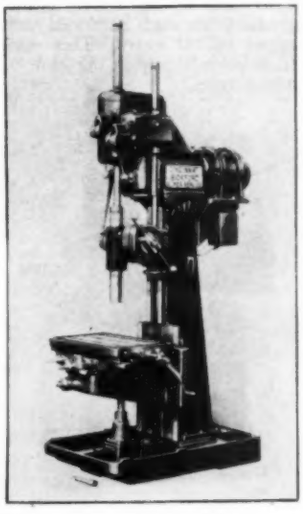
Equally applicable to drilling, reaming and facing in cast iron or for heavy production work in steel, the No. 4 drilling machine has drive by electric motor, and its feed is hydraulic. Rapid approach and return is at the rate of 240 in. per min., while any drilling feed can be obtained instantly from ¼ to 20 in. per min. By varying the control stops a jump feed can be had.

Specifications: center of spindle to face of column, 13 in.; maximum distance from spindle to table, 33 in.; vertical movement of sliding head and spindle, 18 in.; surface of table, 24x23 in.

Drilling Machine, Vertical

Cincinnati Bickford Tool Co., Oakley, Cincinnati, Ohio. (Vol. 79,p.807.)

An improved line of 21- and 24-in. upright drilling machines, known as "Super Service" upright drills, and a new 28-in. drill have been introduced. A reversing motor is used for tapping instead of the mechanical reversing clutches. These machines are built with either round or box columns. The 24-

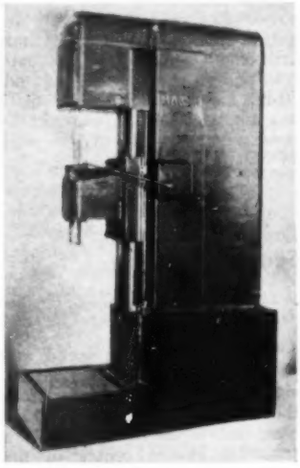


and 28-in. uprights provide twelve speeds from 60 to 1,000 r.p.m. or 90 to 1,500 r.p.m., and nine rates of power feeds. The 21-in. size provides nine speeds in any one of five optional ranges, and four rates of power feeds. All speed and feed changes are controlled by a single lever fitted with direct-reading plate. A compound table may be obtained on the 24-and 28-in. sizes for layout work in the toolroom.

Drilling Machines, Vertical, "Clean-Line"

Baker Bros., Inc., Toledo, Ohio. (Vol.79,p.899.)

Flexibility for quick-change-overs, simplified design and modern appearance are found in the "Clean-Line" heavy-duty, hydraulic-feed drilling machines for drilling, boring and forming. The machine can be built



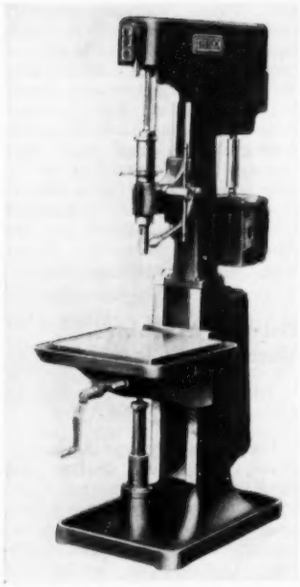
as a manufacturing type with a simplified speed drive incorporating pick-off gears for change of speed, or with a sliding-gear transmission, to give quick changes of speed. Full hydraulic feed is used. Multiple heads are mounted to brackets on the saddle for interchangeability. Machines can be furnished with plain or index tables.

Drilling Machines, Sensitive

Fosdick Machine Tool Co., Cincinnati, Ohio. (Vol.79, p.668.)

An arrangement that enables the operator to bottom tap very accurately on the No. 4 16-in. sensitive drilling machine is secured through an adjustable depth stop. Drive is from a direct-coupled, two-speed motor. With a three-speed gearbox a total of six speeds from 225 to 1,800 r.p.m. are available. The tapping attachment is of the reversing-motor type.

The No. 5 has a power feed instead of a tapping attachment. A depth stop disengages the

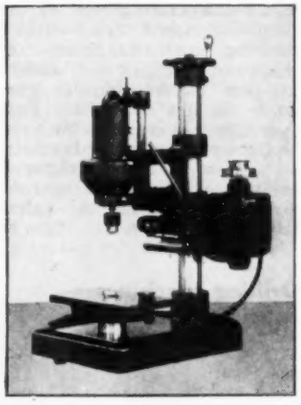


power feed and is accurate to within 0.010 in. The No. 4 has drill capacity of ¾ in. in cast-iron and is built in 16-, 24- and 30-in. sizes. The No. 5 drill has a capacity of 1¼ in. in cast-iron, and is built in 16- and 24-in. sizes.

Drilling Machine, Sensitive, Bench

Langelier Mfg. Co., Providence, R. I. (Vol.79,p.734.)

This Type A high speed, super-sensitive bench drill is designed with a deeper gap from the chuck to the column, and a new sub-table mounted on a trunnion in the center of the



base which can be swiveled and clamped in any circular position. Speeds from 2,000 to 8,000 r.p.m. can be obtained. Capacity, ¼ in. in steel. The spindle mounting eliminates belt pull on the spindle, and insures an accurate and sensitive feed of the drill.

The spindle feed is actuated by a yoke engaging a small pinion attached to the end of the hand lever hub. It is returned by a torsion spring housed in the hub of the hand feed lever.

Drilling Machine, Radial

Carlton Machine Tool Co., Cincinnati, Ohio. (Vol.79, p.376.)

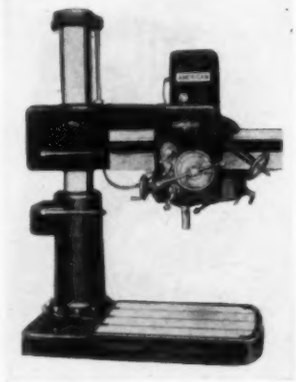
The light-duty model has a 9-in. column and is made in 3- and 4-ft. arm sizes. A reversible motor is mounted directly on the transmission, at the rear of the head. It drives down under the arm, on the largest diameter of the spindle. There are nine

speed changes, covering a range of 75 to 1,500, 100 to 2,000, or 150 to 3,000 r.p.m. Four feed changes are available, from 0.006 to 0.020 in. The spindle has automatic stops controlling its maximum travel.

Drilling Machine, Radial

American Tool Works Co., Cincinnati, Ohio. (Vol.79, p.651.)

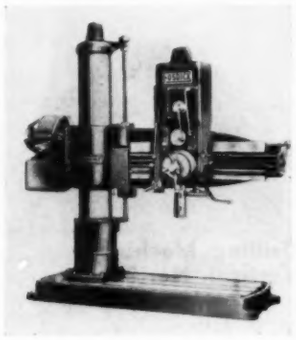
Higher speeds, less operating effort and minimized maintenance are the purposes of the superspeed "Holewizard" radial drill. Equipped with a 5-hp. built-in motor, the drilling capacity of this machine is 2 in. in cast iron and 1½ in. in steel. The corresponding tapping capacities are 2 and 1¼ in., respectively. Eighteen spindle speeds in geometrical progression cover a standard range of 35 to 1,500 r.p.m. Drive to the spindle is through hardened and lapped helical gears. This machine is built only in the motor-driven type.



Drilling Machine, Radial, 5-Ft.

Fosdick Machine Tool Co., Cincinnati, Ohio. (Vol.79, p.668.)

In the 5 ft., 17-in. column radial drill, finger tip control of the head allows the operator to rapid traverse it or to cause it to creep for accurate positioning. The rapid traverse lever hydraulically traverses the head at any speed up to 15 ft.



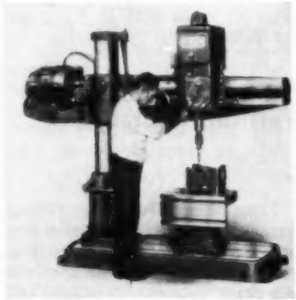
per min. Also on the right-hand side of the head is a handle that controls the clamping or unclamping of the arm by hydraulic means. At the left of the head is a lever for clamping the head to the arm by means of a mechanical arrangement.

Drilling Machine, Radial, High-Speed

Cincinnati Bickford Tool Co., Cincinnati, Ohio. (Vol.79, p.681.)

The high-speed "Super Service" radial provides spindle speeds as high as 3,500 r.p.m. without the use of belts. All speed changes are made at the head through alloy-steel sliding gears. Nine spindle speeds are available. Two feed ranges, made through sliding gears in the head and controlled by another single lever, are optional.

The head is mounted on anti-friction bearings, rolls on a hardened steel arm-way, and is moved at the rate of 3 in. per turn of the handwheel. Power feed is automatically disengaged at the top and bottom limits of spindle travel. Forward or reverse spindle driving clutches are eliminated by the use of a reversing motor.

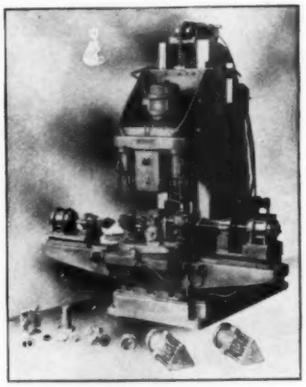


Drilling, Boring and Tapping Machines, Special

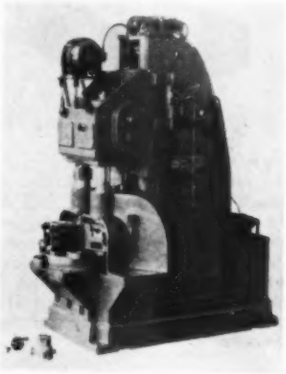
Defiance Machine Works, Defiance, Ohio. (Vol.79,p.804.)

The company has furnished six machines designed for performing the various machining operations on air compressors for household refrigerators. Four are described and illustrated.

A vertical 58-spindle drilling and countersinking machine drills and countersinks the holes in the top, bottom and side flange of the compressor housings. The column has long slides which carry the cluster drive head to which the multiple-spindle heads are mounted. A horizontal fixture pedestal is



58-spindle machine

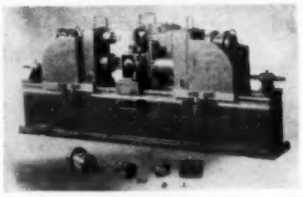


Two-spindle machine

made with two wings that carry the slides on which the two side heads are mounted. Other heads are put on for drilling castings with different centers. This machine is fitted with a 30-in., three-station, hand-operated indexing table with two fixtures at each station. Production is 76 castings per hour.

The two-spindle vertical boring and facing machine, designed for rough and finish boring and facing the bottom of the compressor housing, is a heavy-duty machine. A fixed center head is arranged for Texrope drive. The three-station, 30-in. circular hand-indexing table is fitted with fixtures of the two-jaw, self-centering chuck type. Eighty

Ten-spindle machine



33-spindle tapper

castings are completed per hour.

The horizontal, two-way-opposed, ten-spindle drilling and facing machine has been designed for drilling, countersinking, counterboring, rough and finish facing of the boss for port holes on the compressor housings. Each of the two heads has five spindles. This machine is equipped with a hand-operated, five-station trunnion-type fixture that is mounted on the center member of the base. Hydraulic feed cycle of the machine is automatic. Capacity is 68 castings per hour.

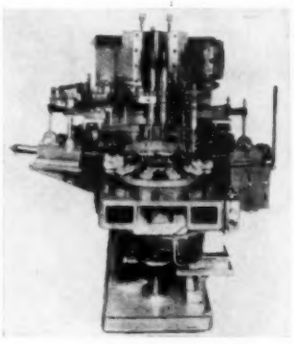
All holes in the top, bottom and sides of the compressor housings are tapped on the horizontal 33-spindle, three-way tapping machine. The base consists of one front member to which the rear member is attached. Heads are arranged for direct-motor drive. Multiple-spindle cluster heads on this machine can be removed and other heads put on for tapping castings with different centers.

Drilling and Tapping Machine, Dial-Type, No. 48

Bodine Corp., 1720 Fairfield Ave., Bridgeport, Conn. (Vol. 79,p.307.)

This machine has a capacity of four ¼-in. drills and two ½-in. taps in mild steel. The taps are advanced and reversed by an oscillating segmental gear. Maximum stroke of the slide is 4 in.

The machine is built as a

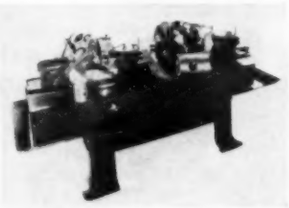


dial-tapping machine, as a dial drilling machine, or as a combination dial drilling and tapping machine. Two sizes of knee are standard—20 and 30 in. Speeds from 10 to 35 strokes per min. are possible. Each tap spindle carries its own compensator—thus allowing different pitch threads to be tapped simultaneously.

Drilling Machine, Piston Smoke-Hole

Millholland Sales & Machine Co., 936 Georgia St., Indianapolis, Ind. (Vol.79,p.507.)

A smoke-hole drilling machine for passenger car, truck and diesel pistons has two No. 2 Millholland automatic drilling units. The operation of drilling and indexing is automatic after the piston has been loaded and feed started. Fixtures are

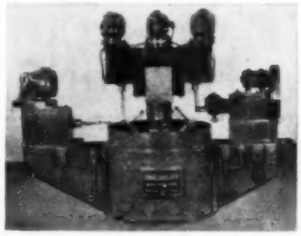


mounted on swivel bases to accommodate varying degrees of angularity of smoke holes found in different styles of pistons. Adjustment for length and size is provided to accommodate from the smallest passenger car piston up to 8-in. diesel pistons, 11 in. long.

Drilling Machine, Station-Type, "Fleximatic"

Kingsbury Machine Tool Corp., Keene, N. H. (Vol.79, p.771.)

Designed to perform drilling, milling, threading or analogous operations at an exceptionally high rate of production, this center column, automatic-indexing machine is adaptable to a



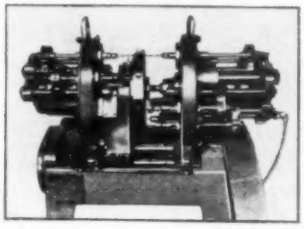
large variety of work. This is due to the fact that the units which make up the machine are equipped with self-contained drive and feed and can be readily relocated.

The rotary table or turret is automatically indexed with harmonic motion in from one to two seconds by a torque motor. Drilling units are tripped electrically through specially designed solenoids, as the indexing motor reverses to lock the table in its set position. This machine can be furnished for from four to eight, or more, indexes of the table per revolution. Double indexing can be provided. The rotary table is 36 in. in diameter with finished surface for fixtures 32 in. in diameter.

Drilling Machine, Two-Way

Buhr Machine Tool Co., Ann Arbor, Mich. (Vol.79,p.705.)

The two-way machine drills and countersinks the cotter-pin hole in a ⅜-in. bolt. A cam operates the index. In the first position countersinking is done on both sides. In the second position the hole is drilled part way through from one side. In the third position the hole is drilled part way through from the other side. In the fourth position the hole is drilled

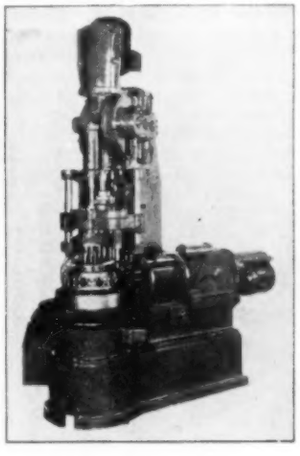


through. In the fifth position the hole is checked and the machine stopped if the part is imperfect, thus eliminating scrap. In the sixth position the part is removed from the index and dropped in a pan.

Drilling Machines, Vertical, Indexing

Millholland Sales & Machine Co., 936 Georgia St., Indianapolis, Ind. (Vol.79,p.632.)

The table will operate at 720 indexes per hour. The vertical drilling unit can include 4, 6, 10, 12 or more spindles. The machine is sensitive enough to drill ⅛-in. holes in steel and powerful



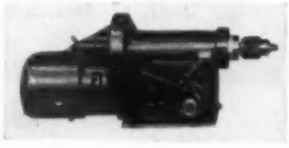
enough to handle ⅞- to 1-in. drills in steel, 2½-in. boring cuts and facing up to 3-in.

The whole mechanism is synchronized by using a standard No. 5 Millholland automatic drilling unit in a vertical position as a master unit for all feeds, both vertical and horizontal, and for automatic indexing. An 18-in. diameter table is regularly employed. In most cases, 70 per cent of the time is actually used in cutting metal.

Drilling and Tapping Unit, No. 0

Bradford Machine Tool Co., Cincinnati, Ohio. (Vol.79,p. 61.)

This unit was designed for use in building up special high-production equipment for drilling, tapping, reaming, spotfac-



ing and hollow-milling. Capacity up to a ½-in. drill. Stroke is obtained by a positive-return, double-track cam. A friction clutch drives the feed. Spindle speeds, 525 to 8,750 r.p.m. in 63 steps, variable by pick-off gears. Stroke, up to 2¾ in. with any feed, or combination of feeds.

Drilling Units, Motor-Driven

Edlund Machinery Co., Cortland, N. Y. (Vol.79,p.344.)

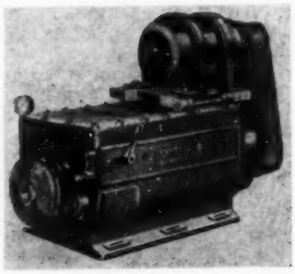
These hand-feed and power-feed motor-driven drill units may be mounted vertically, horizontally or at an angle. A motor drives the spindle through

a pair of helical quick change gears and a two-spline broached quill. On the power feed unit a four-step cone pulley is mounted on this quill for driving the power feed mechanism. This unit has a capacity of ¾ in. in steel and a spindle speed range from 360 to 3,000 r.p.m.

Drilling Unit, Hydraulic

Ex-Cell-O Aircraft & Tool Corp., 1200 Oakman Blvd., Detroit, Mich. (Vol.79,p.186.)

The small unit, No. 23, has an 8-in. stroke; the medium, No. 25, has a 10-in. stroke, and the large, No. 28, has a 12-in. stroke. These units are adjust-

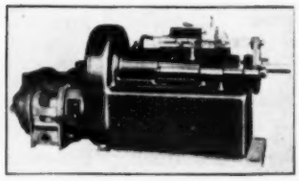


able for length of stroke, length of rapid traverse and length of feed. An electric motor drives the hydraulic pump and drive shaft by V-belts. The pump driving shaft is connected through change gears to the spindle driving shaft. The main quill or ram provides feed for the unit, and has a mounting flange for multiple-spindle heads.

Drilling Unit, Hydraulic

Hoefer Mfg. Co., Freeport, Ill. (Vol.79,p.645.)

The self-contained hydraulic feed drilling unit is obtainable in sizes from 1½ to 10 hp., can be used in any position or at any angle. A motor is mounted on the rear end and its shaft

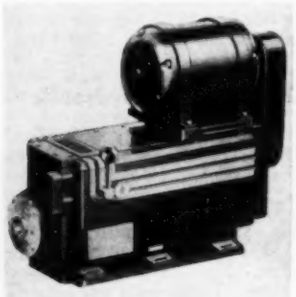


connects directly to an intermediate shaft, which drives the geared pump located within the oil sump. Pick-off gears transmit power to the main spindle. While rapid approach and withdrawal speed are constant, 40 in. per min., the rate of the working feed is from zero to 40 in. per min.

Drilling Unit, Hydraulic

Ex-Cello-O Aircraft & Tool Co., 1200 Oakman Blvd., Detroit, Mich. (Vol.79,p.649.)

The hydraulic power unit is adapted for drilling, reaming, counterboring, spotfacing and similar operations. It can be mounted either singly or in multiple. The smaller unit, No.

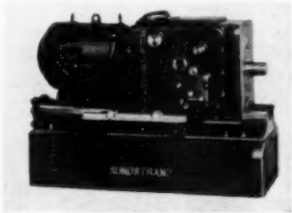


23A, has an 8-inch stroke; the larger unit, No. 25A, a 10-in. stroke. No. 25A unit has feed of 1 to 32 in. per min., with a rapid approach and return of 300 in. per min. Range of feed on the No. 25A unit is 1 to 32 in. per min., with a rapid approach and return of 230 in. per min. Adjustable dogs control the rapid approach, feeds, return and stop.

Drilling Unit, Hydraulic

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.79, p.661.)

A sliding-head hydraulic unit suitable for boring, drilling, reaming and spot facing, milling and similar operations is illustrated. This unit is built in 7½-, 10-, 15- and 20-hp. standard sizes. Drive for rotating



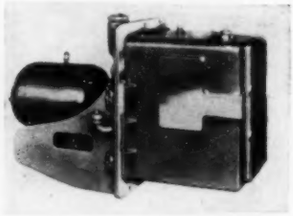
the spindle is by mechanical means.

The automatic operating cycle includes rapid approach to the work, feed, a slower feed and dwell, or dwell only as desired, rapid return and stop. Hydraulic power is used for feeding.

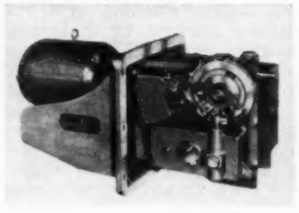
Drilling and Feed Units, Hydraulic

W. F. & John Barnes Co., Rockford, Ill. (Vol.79,p.682.)

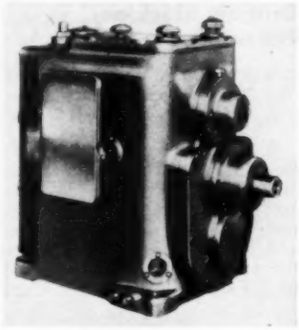
These hydraulic feed units are adapted to heavy boring and drilling operations. They provide rapid approach at a fixed rate; any desired feed rate; an accurately controlled dwell, if required; rapid return to the starting position; automatic stop, or repeat. A constant ratio between the feed rate and the revolutions per minute of the cutting tool is maintained under all operating conditions. These features are secured through two pumps and one control valve which were designed by Barnes. Units are connected with a minimum of piping, joints or passages, and



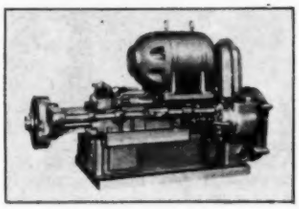
Flange-type unit



Indexing unit



FT Type unit



Square-ram unit

have a closed hydraulic circuit.

The flange type unit may be adapted for manifolding direct to a cylinder or may be piped direct to a valve and cylinder with a minimum of piping.

FF Type Unit is used principally for the operation of boring and drilling heads.

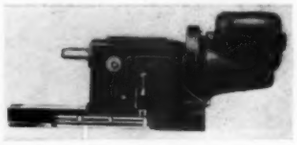
The 3-hp. and 5-hp. hydraulic square ram units are designed for work that does not require the heavy duty hydraulic heads. They can be incorporated in existing machines or in the manufacturer's designs.

An indexing unit is for hydraulically indexing a fixture in relation to the boring spindles.

Drilling Unit, "Hydroscru"

Buhr Machine Tool Co., Ann Arbor, Mich.. (Vol.79,p.705.)

The "Hydroscru" power unit moves on the ways of a stationary base. Spindle speeds are variable and secured by change gears. The rate of feed can be changed by accessible change gears, giving a range of from



0.002 in. to 0.030 in. Feed and rapid-advance control dogs are located in front for quickly changing the stroke, feed and rapid advance. The "Hydroscru" unit may be used either as a single unit or on two, three, or four machine ways, and in any combination of horizontal, vertical or angular mountings. Feed stroke is 18 in.

Drilling Unit, Automatic, No. 3

Millholland Sales & Machine Co., Indianapolis, Ind. (Vol. 79,p.936.)

This unit, which combines cam and hydraulic operation, has a 3-in. stroke, uses a 1- to 3-hp. motor, and has a drilling capacity up to 1 1/16 in. in steel. Unit has high speed capacity up to 3,000 r.p.m. Cam operation permits cycle operations up to 60 per minute or down to one minute or more per cycle.

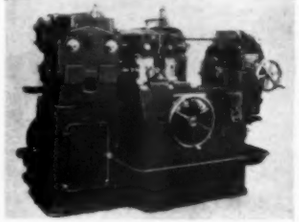
GEAR CUTTING AND FINISHING MACHINES

Generating Machine, Gear

Farrel-Birmingham Co., Buffalo, N. Y. (Vol.79,p.672.)

An improved cutter relief mechanism permits higher operating speed and increases the accuracy and improves the finish of the work. Thus, it is possible to perform new machining operations which are entirely disassociated with gear cutting. The helical guides are of new design. Each set of guides is an integral unit readily removable, thus providing an easy means of changing from helical to straight teeth or from one helix angle to another.

An automatic in-feed, or

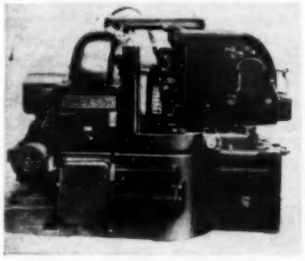


depth-feed, mechanism automatically feeds the work towards the cutters in any desired increment per revolution of the work. These increments may be uniform or variable as required. Embodied in this mechanism is a device for withdrawing the work from the cutters when the finish cut has been made and for stopping the machine.

Roughing Machine, Spiral-Bevel

Gleason Works, Rochester, N. Y. (Vol.79,p.218.)

The No. 15 spiral bevel pinion rougher is said to be from two to three times as fast in production as the older type. The machine will rough both spiral bevel and hypoid pinions. It is hydraulic in all of its movements except the drive to the cutter. The circular move-



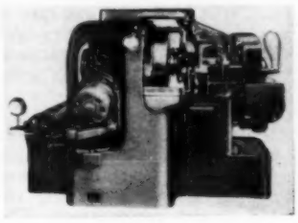
ment of the cradle and work spindle for generating the tooth shape are derived from a reciprocating movement of a pair of racks which are connected and actuated by an hydraulically operated roll piston. Pinions of different ratios can be cut by changing the ratio of roll gears in the train to the work-spindle.

Specifications: longest cone distance, 30 deg. spiral angle, 7⅜ in; largest pitch angle, 26 deg. 34 min.; smallest pitch angle, 7 deg. 7 min.; extreme ratio, shafts at 90 deg., 8 to 1; largest pitch diameter, 8 to 1 ratio, 1¼ in.; largest pitch diameter, 2 to 1 ratio, 7 in.; largest pitch, Gleason system, 2½ D.P.; maximum full depth, ¾ in.; longest face, 1¾ in.

Finishing Machine, Gear, No. 11

Gleason Works, Rochester, N. Y. (Vol.79,p.473.)

The No. 11 single-cycle gear-finishing machine is said to be the fastest yet devised for finish-cutting spiral-bevel and hypoid ring gears. The gear to be finish-cut is previously rough-cut in the standard Gleason roughers. The face-mill finishing cutters consist of two series of inserted blades. First, a series of blades of progressively increasing depth shape and space the tooth by a succession of very light cuts. Then follow a series of finishing blades, each cutting the full depth, which finally size the whole

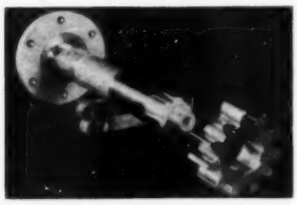


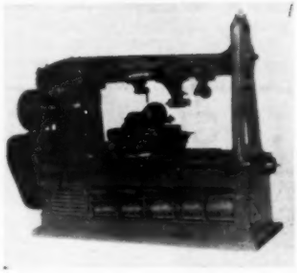
profile of the tooth, and produce the desired smooth finish. The cutter and gear remain in normal full-depth operating position during the entire cycle, and provision is made for indexing by a gap in the cutter which follows after the second series of blades. The cutter rotates at a uniform speed. When the cutter revolutions equal the number of teeth in the gear, the gear is finished. A power chucking and stripping mechanism is built into the work-spindle.

Hobbing Machine, Taper-Spline

Barber-Colman Co., Rockford, Ill. (Vol.79,p.217.)

The company has developed a taper spline which is adaptable to any machine or mechanism requiring a gear, wheel, pulley, arm or similar unit to be mounted removably on the end of a shaft or axle. This construction does not weaken the shaft. Therefore, shaft dimensions may be reduced for a





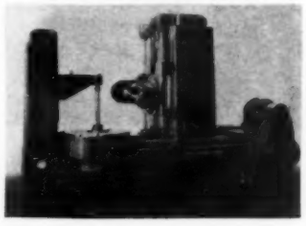
given power-transmission requirement. Other advantages of the taper spline are: greater key contact area, greater stress distribution, keys cannot loosen or be lost and corners of keys will not round off under reciprocating stresses.

The Barber-Colman taper spline hobbing machine resembles the company's Type "A" machine. The hob-slide swivel construction is the main point of difference, as it has means to traverse the hob not only laterally but also longitudinally. The hob has a tapered form. The longest teeth enter the work first and cut the deepest part of the keys. As the hob moves along the shaft, it also moves across it so that progressively shorter teeth cut shallower portions of the spline. A given hob can make a variety of tapers on a given size of shaft, but for a different size shaft a separate hob is required.

Hobbing Machine, Gear

Gould & Eberhardt, Newark, N. J. (Vol.79,p.680.)

This machine, the No. 72-H, is suitable for rapid production of spur gears, single and double helical gears, and worm gears. It has capacity to cut gears up to 48 in. in diameter within the support and 80 in. with the support removed. Face capacity for spur gears is 20 in., and the rated pitch capacity is 1¼ D.P. in steel. Net weight, 26,000 lb.



This universal machine uses the vertical cutting principle with the hob slide mounted on an adjustable stanchion and the work spindle fixed within the base. The swivel cutter support has an angular adjustment of 180 deg. to cut right- and left-hand helical gears. A differential mechanism for cutting helical gears is built in. An automatic infeed mechanism is also incorporated.

Shaper, Hourglass-Worm, No. 6

Fellows Gear Shaper Co., Springfield, Vt. (Vol.79,p.770.)

The No. 6 hourglass-worm gear shaper will cut right- or left-hand threads. The cutter rotates in mesh with the work and reciprocates at the same time that it is feeding into the

required depth. Work makes one complete revolution after the cutter has reached full depth, producing smooth finish. Depth of feed is controlled by a cam provided with a dwell for the finish cut. The same cutter is used for roughing and finishing. Provision is made through change gears for cutting different numbers of teeth or threads, and for different depth and rotary feeds.

Chamfering Machine, Gear-Tooth

W. C. Lipe, Inc., Syracuse, N. Y. (Vol.79,p.252.)

The single-spindle, high-speed, gear-tooth chamfering machine mounts the gear on the workhead by air-actuated collets or by a drawrod and U-washer clamp. It is automat-

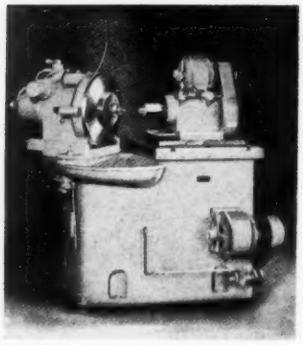
ically indexed by means of a hardened and ground master index ring. The cutter is automatically fed into the work, usually straddling two teeth. Operation, up to 150 teeth per min. Any type of gear commonly used as well as splines can be chamfered. Machine will burr helical or spur teeth, and drill or mill.

Finishing Machines, Gear

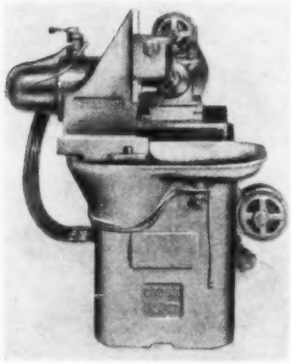
Cross Gear & Machine Co., 3250 Bellevue Ave., Detroit, Mich. (Vol.79,p.185.)

Three machines have been developed for performing various rounding, pointing, chamfering and burring operations on all gears. The No. 35 gear tooth rounder is fully hydraulically controlled. Indexing is accomplished from the already formed

No. 35 gear tooth rounder



No. 40 gear tooth pointer



No. 50 chamfering machine

tooth by means of a hydraulically actuated pawl. Specifications: gear face capacity, 15 in.; gear diameter capacity 36 in.; gear pitch capacity, 2 pitch or finer.

The No. 40 gear tooth pointing machine is a semi single-purpose tool which employs a hollow-mill type of cutter that is moved into the stationary work. Automatic indexing, hydraulically controlled, is accurate within 0.0001 in. Specifications: gear face capacity, 12 in.; gear diameter capacity, 20 in.; gear pitch capacity, 2 pitch or finer.

The cutter spindle of the No. 50 gear-tooth chamfering machine remains fixed while the work spindle is movable and the work is presented to the cutter. While the gear is being rotated, the work-holding spindle is moved forward and back by a guide cam. The work spindle is independently driven by a hydraulic motor. Base of the work-head is graduated to facilitate setting up.

Specifications: gear face capacity, 15 in.; gear diameter capacity, 15 in.; gear pitch capacity, 2 pitch or finer. The No. 40 and No. 50 machines are also available in two-spindle, two-station types.

Shaving Machine, Internal-Gear

Michigan Tool Co., 7171 E. Six Mile Road, Detroit, Mich. (Vol.79,p.836.)

A finishing machine operating on the same "shaving" principle as the "crossed-axes" machine for finishing helical and spur gears, has been developed for finishing internal gears. The pot-chuck is fitted with adapters.

The laminated or serrated cutter is mounted on a vertical arbor, which in turn is mounted in an eccentrically driven holder. As the cutter arbor rotates—driving the internal gear which is free to turn with its adapter on roller bearings—the arbor holder slowly rotates eccentrically so that the arbor itself moves gradually on an arc, approaching the internal gear. The cutting teeth feed into the internal gear teeth.

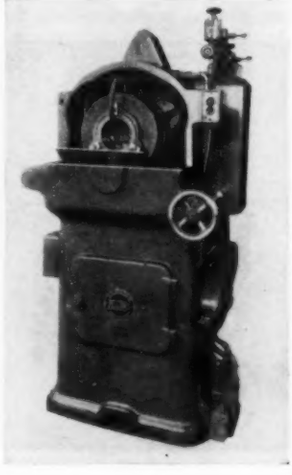
At the center point of this

arc, the pitch circles of the cutter teeth and internal gear teeth coincide, and the maximum depth of cut has been reached. At the end of the travel of this arc, the machine automatically reverses and the arbor travels back through the same arc. It will be noted that on the forward travel the flanks on the back side of the internal gear teeth are finished, while on the reverse travel the flanks of the forward side of the teeth are similarly shaved.

Lapping Machine, Gear, Planetary-Type

Fellows Gear Shaper Co., Springfield, Vt. (Vol.79,p.410.)

A planetary-type gear lapping machine particularly adapted to the lapping of small fine-pitch gears. The lap, which is of the internal-gear type, is held stationary. Attached to the

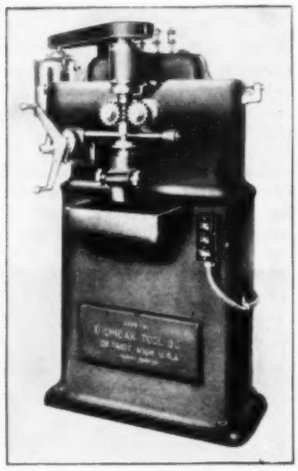


work-spindle of the machine is a self-contained planetary-type head carrying three supplementary work-spindles. Each spindle has a pinion attached to it and meshing with the individual internal gear arranged to offer resistance to the free rotation of the work. The planetary head, in addition to being rotated, is also reciprocated. The three work arbors each carry six gears. Actual lapping time dose not exceed ½ min. for 18 gears. This method can be adapted to the lapping of both spur and helical external gears.

Lapping Machine, Steering-Worm

Michigan Tool Co., 7171 E. Six Mile Road, Detroit, Mich. (Vol.79,p.739.)

Features of this machine include automatic timing, variable for each side of the thread, adjustable center distances allowing recutting of laps, two lap spindles with an adjustable hydraulic brake on each, and work



running on centers, eliminating adapters and costly tooling.

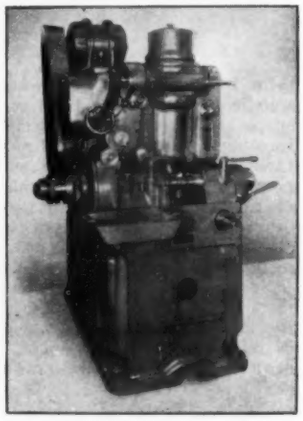
The cycle is adjusted by means of an automatic cut-out relay from 15 sec. to 5 min. for one direction. A second relay then cuts in, reversing the motor and lapping the reverse side of the thread. The machine is designed to take care of the complete range of steering gear worms both straight and hour-glass.

Lapping Machine, Worm

Fellows Gear Shaper Co., Springfield, Vt. (Vol.79,p.770.)

This machine for lapping straight worms employs a throated cast-iron worm wheel as a lap. Work is held on an arbor, and the latter is mounted between a driving and live center. Capacity is 4-in. pitch diameter and 5-in. thread length.

The table carrying the work is reciprocated by a crank mechanism, adjustable for stroke length. Headstock center is positively driven by a motor through change gears. The lap is rotated by the work, and an adjustable brake on the lap spindle furnishes the necessary resistance to expedite the lapping action.



GRINDING MACHINES

Grinder, Cylindrical, Semi-Automatic

Landis Tool Co., Waynesboro, Pa. (Vol.79,p.647.)

Because certain parts may be more economically ground on machines arranged for semi-automatic operation, the 10-in. Type C hydraulic grinder is shown tooled in this manner for

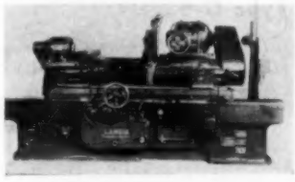
camshaft main bearings. The standard 10-in. Type C plain hydraulic bed is used. The headstock is also standard. Hydraulic power actuates the movement of both the workrest shoes and the sizing heads. The Landis-Solex pneumatic sizing device is employed.

The hydraulic infeed compensates for the different point at which grinding begins when varying diameters are being ground. To eliminate time loss a movable bar in which are inserted pins of various lengths, is located underneath the wheel base. Movement of the bar is timed with the traversal of the carriage so that the correct pin is brought into play for each diameter being ground.

Grinder, Cylindrical, Hydraulic, Type D

Landis Tool Co., Waynesboro, Pa. (Vol.79,p.505.)

The 10-, 14- and 16-in. Type D plain hydraulic grinders have spindle drive through multiple V-belt. A 30-in. diameter grinding wheel is standard. The hydraulic system is of the dual

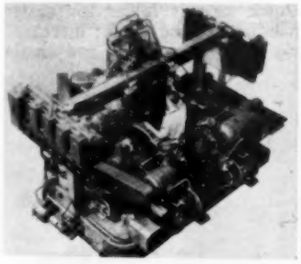


cylinder type. It provides a range of work table speeds between 6 and 240 in. per min. A hydraulic straight infeed mechanism is available. Drive from the jackshaft to the face-plate is through multiple V-belts. The work-drive motor is of the constant-speed type, a range of 65 to 200 r.p.m. being available. Type D machines are offered in hydraulic or hand traverse models, and in lengths of 18, 36, 48 and 72 in.

Grinder, Plunge-Cut, Special

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio. (Vol.79,p.538.)

A special-purpose machine that by means of unit construction may be adapted to change in design of the manufactured product, was designed for grinding four surfaces on automobile axle shafts. Plunge cutting operations may be carried on either



singly or in multiple on a variety of work carried between centers. Operation, however, must be on a quantity-production basis.

The wheelheads are built-up in units. Hydraulic truing is supplied for each grinding wheel. Upon the sub-base is mounted the wheelhead carrying the spindle. Power infeed motion of the grinding wheel is obtained by a cam. As the cam is rotated the wheelhead tilts about a pivoted bearing. A loading attachment is furnished.

Each wheelhead assembly is a self-contained unit, and is applied singly or in groups. A loading attachment is furnished.

Grinder, Roll

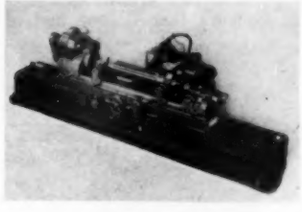
Farrel-Birmingham Co., Ansonia, Conn. (Vol.79,p.221.)

The headstock drive on this 36-in. machine is self-contained in a cast-iron case, mounted on the front bed. Three reductions, all of which are multiple V-belt drives, reduce the speed of the 300- to 1,200-r.p.m. motor to give a range of roll speeds from 11 to 44 r.p.m. An improved flexible faceplate automatically minimizes inaccuracies due to minor errors in setting the roll. Other features: cambering device, centralized controls, larger wheel and in turn lower spindle speed to allow closer bearing fit.

Grinder, Roll, Improved

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio. (Vol.79,p.706.)

Many improvements have been incorporated in the roll grinder making it simpler to operate and at the same time producing more accurate work having a higher quality of finish. It is built with 20-, 24-, and 28-in. swing and distance between centers up to 192 in. A hydraulic cylinder located behind the wheel guard supplies the motive force for traversing the diamond across the wheel. It is arranged so that the wheel can be trued either perfectly straight or with a slight crown. A new radial type of spindle bearing increases the accuracy and finish obtainable. Two types

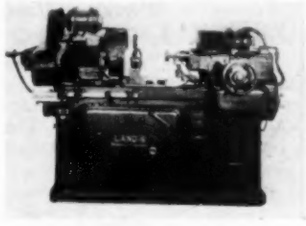


of cambering mechanisms are available for these machines, a bar type and a cam type.

Grinders, Internal, Hydraulic

Landis Tool Co., Waynesboro, Pa. (Vol.79,p.216.)

The Type C hydraulic internal grinder may be used for the rapid grinding of similar parts within a close degree of accuracy. The 15x8 in. size is for smaller bores and has the Landis-Solex sizing device and a hydraulically reciprocating grinding wheel fixture. The 15x11 in. size is for the deeper bores. When grinding bores 2¾ in. in depth or less, the grinding wheel

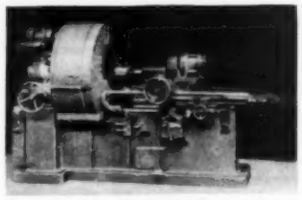


fixture is hydraulically reciprocated; when the bores are deeper the work table is hydraulically reciprocated. The cross feed automatically compensates for any spring in the grinding wheel quill. Bores having steep tapers with angles up to 90 deg. may be ground.

Grinder, Internal, Gap, No. 72A

Heald Machine Co., Worcester, Mass. (Vol.79,p.642.)

The No. 72A gap internal grinder was designed to handle gears, plates, connecting rods, housings and similar parts hav-



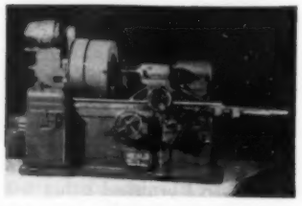
ing medium-sized holes but requiring a large work swing. The machine has a grinding stroke of 7½ in. and will swing work 38 in. in diameter by 15 in. in length. Hydraulic drive for the table and a quick-acting truing device are used.

Grinder, Internal, No. 74

Heald Machine Co., Worcester, Mass. (Vol.79,p.642.)

The No. 74 internal grinder is a large machine for handling a wide variety of work. The base is T-shaped to give support to the workhead. Hydraulic table operation gives unlimited table speeds between minimum and maximum. The workhead can be swiveled for angular work. A hole through the spindle makes provisions for a collet-operating tube.

Specifications: Swing over

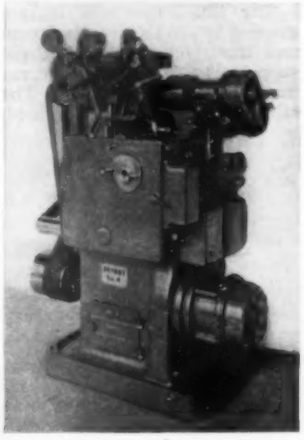


table, 14 in.; swing inside standard water guard, 26 in.; maximum diameter of hole ground, 20 in.; taper, maximum included angle, 30 deg. toward front; weight, 12,000 lb.

Grinder, Internal, Automatic

Bryant Chucking Grinder Co., Springfield, Vt. (Vol.79, p.674.)

High-production grinding of small-diameter bores in bearing rings, rolls and gears is the field of the No. 4 automatic grinder. The machine embodies the firm's automatic electric

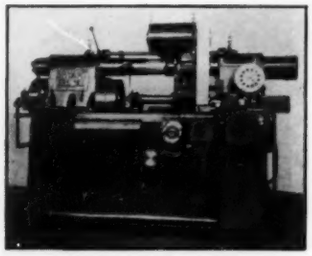


sizing device. Total chuck swing without guard is 6½ in. in diameter and the maximum wheel-slide traverse is 3¾ in. A crank traverse for the grinding stroke gives a very smooth control of the wheel on a short stroke. This machine is intended particularly for big production jobs which come under 2 in. in length, and therefore compressed air is used to carry the wheel-slide in and out of working position.

Grinder, Chucking, No. 16

Bryant Chucking Grinder Co., Springfield, Vt. (Vol.79,p.675.)

This machine has a capacity of 16 in. in diameter without the guard and a 15½ in. maximum wheel-slide traverse. While designed primarily for grinding holes up to 8 in. in length the machine can handle



work up to 14 in. in length on occasion. Furnished either with or without automatic sizing, the No. 16 is suitable for mass production at a high rate or for general manufacturing where the lots are smaller. Full hydraulic control is afforded by utilizing the slide bar as a cylinder for the slide traverse.

Other machines in this series are the No. 16-A, a two-spindle hole and face grinder, and No. 16-L gap grinder the same length but capable of handling work to 30 in. in diameter.

Grinder, Surface, Hydraulic, No. 5

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79, p.658.)

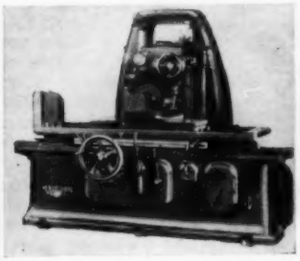
The No. 5 hydraulic surface grinder is suitable for toolroom and manufacturing use. Rigid support to the table secures maintenance of accuracy. The table is hydraulically operated,

providing any desired longitudinal feed up to 60 ft. per min., and any desired rate of automatic transverse feed up to 0.15 in. per reversal of longitudinal travel.

Grinders, Surface

Mattison Machine Works, Rockford, Ill. (Vol. 79,p.662.)

The 12- and 14-in. precision hydraulic surface grinders have been improved by many minor refinements and by several more important ones. For controlling the up and down travel of the entire wheel-slide, a hoist motor with a sensitive switch for controlling it has been added. The rotor of the wheel-spindle motor is mounted directly on the wheel spindle and balanced. Longitudinal table travel is hydraulically operated by two cylinders which provide uniform speed in either direc-

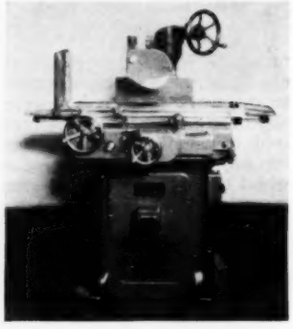


tion. Table speed ranges are from 30 to 90 ft. per min. Traverse feed of the wheel is also hydraulically operated.

Grinder, Surface

Norton Co., Worcester, Mass. (Vol.79,p.654.)

The 6x18-in. surface grinder has an hydraulic automatic cross-feed instead of a mechanical type previously used. The pump drive eliminates vibration



from this source. Wheel spindle bearings are considerably larger and are lubricated by oil rings. The spindle flange now runs between two bronze thrust plates.

Grinder, Surface, No. 3B

Abrasive Machine Tool Co., E. Providence, R. I. (Vol.79, p.686.)

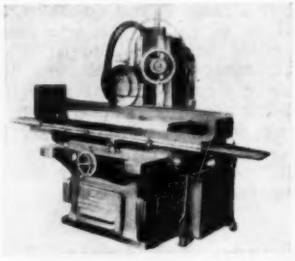
The No. 3B has a longitudinal capacity of 24 in., a transverse capacity of 8 in., and a vertical capacity of 12 in. A 10-in. diameter by ¾ in, thick wheel, with a 3-in. hole is standard. The two table speeds are 20 ft. and 40 ft. per min. The feeds are automatic in

longitudinal and transverse directions. Automatic cross feed is adjustable from 0 to 0.070 in.

Grinder, Surface, Hydraulic, No. 65

Gallmeyer & Livingston Co., Grand Rapids, Mich. (Vol.79, p.686.)

The No. 65 hydraulic feed surface grinder has table working surface of 12x48 in. Maximum distance from wheel to table under the full 12-in. wheel is 17 in. Maximum longitudinal speed is 125 ft. per min. Cross feed is automatically operated and may be set so as to operate at each reversal of the reciprocating table, or at one end of the stroke only.



Two spindle speeds are available through a V-belt drive from a motor mounted on an adjustable bracket. One speed is just right for the full size wheel and a second and higher speed is used after wheels have worn down to 7 or 8 in. diameter.

Grinder, Surface, Hydraulic

Thompson Grinder Co., Springfield, Ohio. (Vol.79, p.704.)

The "B" Special hydraulic surface grinder has a table surface 9 in. wide by 40 in. long and the height under the wheel on the standard machine is 12 in. with a 10-in. wheel. This type of surface grinder is adapted to work that is long and of

medium weight, such as spline shafts and broaches. Head and tailstock assemblies are also adaptable where centers are required for grinding.

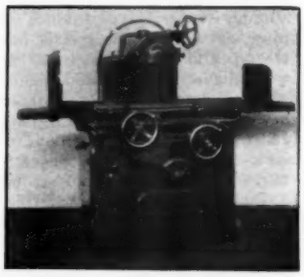
Feed of the work table varies from 10 to 100 ft. per min., automatic cross feed, 1/32 in. to ¾ in. per reversal. There are also a slow continuous wheel truing speed and a rapid traverse.

Two extra units that increase production are the hydraulic counter-balance and the automatic wheel-truing device. The latter trues the wheel at each complete stroke of the wheelhead travel.

Grinder, Surface, Type G-4

Diamond Machine Co., Providence, R. I. (Vol.79,p.704.)

Known as the Type G-4 this grinder differs from other models in this series principally in the location of the handwheel

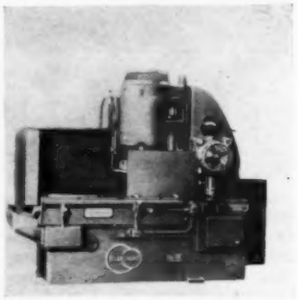


and in the greater flexibility of operation. The outstanding feature claimed for it is its ability to do fast and accurate grinding.

Grinder, Surface, No. 18

Blanchard Machine Co., Cambridge, Mass. (Vol.79,p.665.)

Power traverse for the chuck is a feature of the No. 18 surface grinder. This machine is similar to the No. 16, but has several improvements and additional features as follows: Waterguards open at the front; chuck face is lower for easier handling of the work; increased rigidity of spindle and main



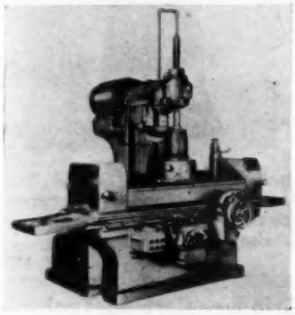
members of the machine; individual motor drives for table traverse, head raising and lowering, chuck rotation and water pump; feeds from 0.004 to 0.080 in. per min.; accurate feed stop for any distance less than 0.100 in.; water capacity of 125 gal., and a quick stop for the spindle.

This machine carries an 18x 5x15-in. grinding wheel and a magnetic chuck which may be 26, 30 or 36 in. in diameter. with the work height under the new wheel 12 in. in all cases.

Grinder, Surface, Vertical

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.248.)

The 14-in. vertical surface grinder has hydraulic table drive and table speeds from 0 to 100 ft. per min. End play in the spindle is prevented by a series of compression springs

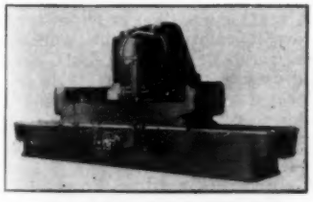


which support the upper bearings. The wheel is 14 in. in diameter, 5 in. high and 1¼ in. thick. Down-feed mechanism is of the ratchet wheel and pawl type, and produces power feeds ranging from 0.0025 to 0.005 in. at each end of the table stroke. Automatic table reversing takes place at any desired point. All controls are grouped at the front. Table working surface is 12x36 in.; maximum longitudinal travel, 45 in.

Grinder, Surface, Vertical

Hanchett Mfg. Co., Big Rapids, Mich. (Vol.79,p.869.)

The No. 400 series vertical spindle grinder permits the grinding of surfaces when it is desirable to have the work lie flat instead of on edge. Work is held by magnetic chucks or fixtures at speeds ranging from

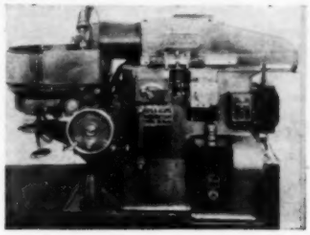


0 to 90 ft. per min. Ability to adjust the built-in grinding wheel head so that the spindle is exactly at 90 deg. with the table makes it possible to hold to very close tolerances without sacrifice in production rate. Grinding wheel chuck is a 22-in. segmental type.

Grinder, Surface, Rotary

Arter Grinding Machine Co., Worcester, Mass. (Vol.79, p.708.)

The machine is built in three sizes having chuck diameters of 8 in., 12 in. and 16 in. The wheel spindle is driven directly by a motor, the rotor of which

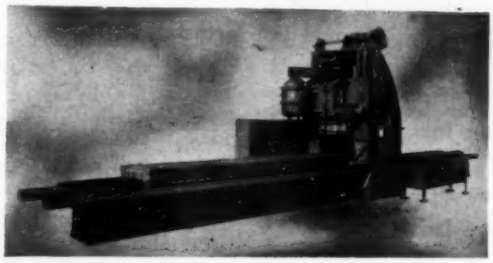


is mounted on the spindle. The chuck is driven by V-belts from a hydraulic motor. Two oil pumps are mounted in tandem. The higher-pressure pump delivers oil to the hydraulic motor through a suitable valve so that an infinite number of chuck speeds is available. The lower-pressure pump delivers oil to a cylinder for moving the wheelslide hydraulically. The work table can be tilted for grinding concave or convex surfaces.

Grinder, Surface and Shear Blade

Hill Clutch Machine & Foundry Co., 6400 Breakwater Ave., Cleveland, Ohio. (Vol.79,p.841.)

Vertical spindle and compact construction of the vertical column and spindle mounting permit the grinding of flat surfaces to within 0.0005 in. By the use of two self-aligning ball-socket nuts, the wheelhead can be held in any position from the ver-



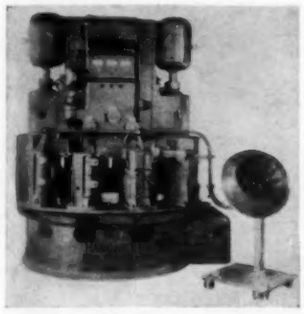
tical to the maximum angle for grinding concaves. Table is hydraulically driven at 0 to 90 ft. per min. Standard wheel used is a 26-in. sectional type. Work capacity is 22 in. wide and from 86 to 216 in. in length.

Grinder, Surface, Rotary, No. 72

Hanchett Mfg. Co., Big Rapids, Mich. (Vol.79,p.378.)

The grinder is of special construction and fitted with automatic means for loading, clamping the work, grinding, and unloading finish-ground parts. A circular work table 72 in. in diameter by 18 in. wide, is driven through a variable-speed unit at speeds from ¾ to 4 r.p.m.

The work passes successively beneath three grinding wheels, each of which is provided with automatic sizing control. The fixture is mounted directly on the finished table top and com-

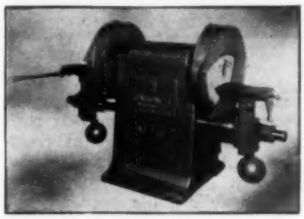


prises 84 stations, each of which has automatic clamping means. Pieces go around the table twice for grinding both ends.

Grinders, Disk, 200 Series

Gardner Machine Co., Beloit, Wis. (Vol.79,p.906.)

Powered by a standard motor mounted on a bracket at the rear of the base, the spindle speed of these grinders can be controlled to give the proper

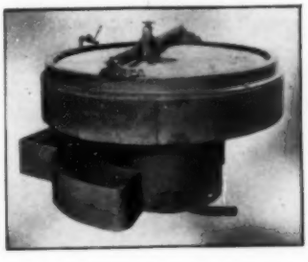


peripheral speed. Spindles are mounted in two cartridges or pillow blocks. Bearing caps are removable. Standard universal lever-feed tables or plain wood tables are available.

Grinder, Disk, Horizontal

Gardner Machine Co., Beloit, Wis. (Vol.79,p.186.)

Redesigned with sturdier construction and broadening of the work range, the No. 24 53-in. horizontal disk grinder is available in two types, one with a



vertical built-in shaftless motor and the other driven by a flanged motor mounted in a horizontal position, driving the vertical spindle through spiral bevel gears. Either machine is designed to carry heavy-duty "Wire-Lokt" abrasives, and is also designed to permit wet grinding.

Grinder, Abrasive-Band

Walls Sales Corp., 96 Warren St., New York, N. Y. (Vol.79, p.189.)

The features of the "Simplex" M-6 abrasive-band grinder are the instantaneous changeability and fixed running position of the abrasive band and the auto-

matic band tension. It is built for production work, running at 1,900 ft. per min. Weight, 425 lb.

Grinder, Belt

Porter-Cable Machine Co., Syracuse, N. Y. (Vol.79,p.189.)

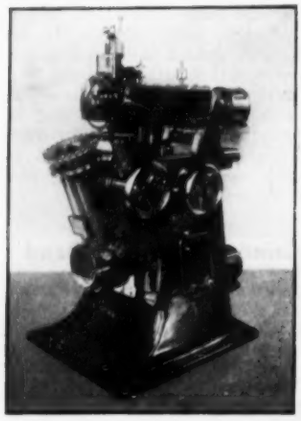
The Type B-12 belt grinder can be used for grinding off burrs, smoothing off rough stampings, smoothing down weld

spots, and all other small parts grinding operations. Motors of ½ or ¾ hp. may be used. The length and width overall are 34 and 11½ in., respectively.

Grinder, Face-Mill

Oliver Instrument Co., Adrian, Mich. (Vol.79,p.649.)

The cutter is mounted on a work spindle which is mechanically indexed to bring each tooth under the grinding wheel.

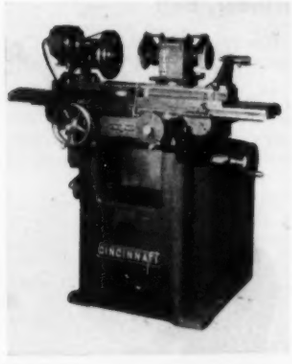


The cutter is held in proper relation by means of a lip rest attached to a ram that carries and reciprocates the wheel. No index plates are used, the adjustment for various numbers of teeth being made in the index mechanism. The wheel cannot load because at each reciprocation it passes over a diamond dresser.

Grinder, Cutter and Tool, Improved No. 2

Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio. (Vol.79, p.474.)

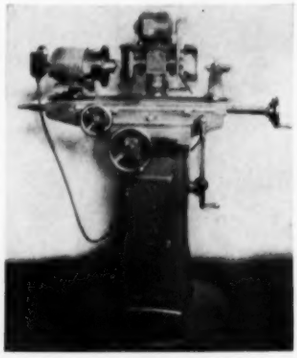
The machine has been improved by the adoption of a solid and heavier table slide, and by the addition of duplicate operating controls on the left side of the machine .when facing the machine from the rear. Regardless of the type of work, this machine affords a normal operating position.



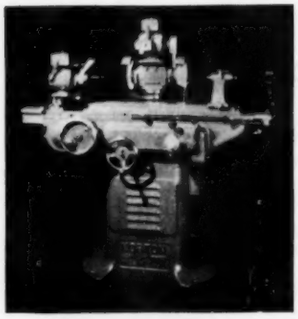
Grinders, Tool and Cutter, Nos. 1 and 2

Norton Co., Worcester, Mass. (Vol.79,p.654.)

Several improvements have been made in the No. 1 universal tool and cutter grinder illustrated, as follows: heavier base and saddle ways, larger handwheels and relocation of the lever for operation of the table. This machine can be operated from either the front or the rear, the cross-feed being provided with a handwheel at both points and graduated in thousandths. Swing of this machine is 10 in.



No. 1 Tool Grinder



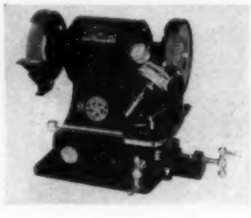
No. 2 Tool Grinder

Hydraulic table traverse for cylindrical or internal grinding, and in some cases the grinding of cutters, is a feature of the No. 2 universal tool and cutter grinder. Swing is 12 in. A handwheel at the front as well as at the rear permits operating the saddle from both positions. The machine can be equipped with a left-hand footstock.

Grinder, Drill

Star Machine & Engineering Co., Bloomfield, N. J. (Vol.79, p.510.)

The capacity of the precision drill grinder is 81 sizes of drills including 25 fractional sizes from $\frac{1}{8}$ to $\frac{1}{2}$ in. inclusive, numbered drills from 1 to 30, and all letter-size drills. The drill is inserted in the chuck the proper distance, and the chuck rotated so that one lip comes to the position shown by the zero dial reading on the indicator. The cam handle is moved from right to left, and at the same time the chuck carriage is fed to the required depth of cut. By moving the cam handle through its entire arc, the grinding of one lip is completed. Grinding is done on a peripheral face which lessens the tendency to burn the drill.



Grinder, Drill

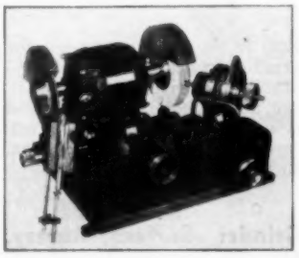
Hisey-Wolf Machine Co., Cincinnati, Ohio. (Vol.79,p.573.)

For sharpening straight or tapered shank drills, 1-, 2-, 3- or 4-lip drills, flat or chucking drills, flat twisted drills and drills with over-size shanks, the machine's standard equipment includes one cup-shaped grinding wheel and one wheel for point thinning. Two machine sizes, one for drills No. 52 to $1\frac{1}{4}$ in. diameter and one for drills $\frac{1}{8}$-$2\frac{1}{2}$ in. diameter.

Grinder, Drill, 18D

Wells Mfg. Co., Greenfield, Mass. (Vol.79,p.741.)

The 18D drill sharpener will produce and duplicate any desired shape of point. Drills are sharpened by a full 360-deg. rotating motion which gives equal length of cutting edges of the same angles with the center line of the drill, and identical relief angles at the periphery on both lips, increasing in angle to the center of the drill. Any relief angle from 6 to 12 deg. may be obtained.



Grinding and Lapping Machine, Carbide

Stokerunit Corp., 5325 W. Rogers St., Wilwaukee, Wis. (Vol.79,p.444.)

The Simplex carbide grinding and lapping machine has two tables, each of which can be shifted in relation to the face of the wheel and for accurate angular settings. A protractor is also furnished.

Grinder, Carbide-Tool

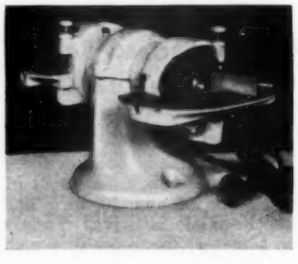
Ex-Cell-O Aircraft & Tool Co., 1200 Oakman Blvd., Detroit, Mich. (Vol.79,p.649.)

In the improved carbide tool grinder a built-in $\frac{3}{4}$-hp. motor is mounted at the top of machine and drives two diamond wheels. A reversing switch provides the correct rotation of the wheels for right- or left-hand tools. An adjustable tool support table is located at each end of the machine.

Grinder, Carbide-Tool

Thomas Prosser & Son, 15 Gold St., New York, N. Y. (Vol.79,p.711.)

The grinder is furnished in three sizes to regrind cemented carbide tool bits and tools. The Model A, illustrated, is for sharpening tool bits up to $\frac{5}{8}$ in.



square. The adjustable tables are planed and slotted and a combination protractor and diamond holder is furnished as standard equipment. The grinder has two 3-in. cup wheels, one for roughing and one for fine finishing. The latter may be either a fine silicon carbide wheel or a diamond impregnated wheel. The C model has a ½-hp. motor with ample power to employ 10-in. wheels.

Grinder, Tool

Wesson Co., 1015 Mt. Elliott Ave., Detroit, Mich. (Vol.79, p.747.)

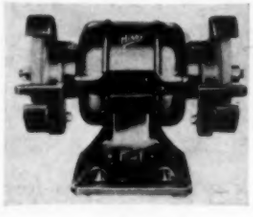
This double-headed, diamond-wheel grinding machine has a two-speed reversible motor with pump and sump inside of the

base. The grinder is equipped with a safety switch so constructed that the motor must be shut off before reversing.

Grinder, Bench

Hisey-Wolf Machine Co., Cincinnati, Ohio. (Vol.79, p.347.)

This ¾-hp. bench or pedestal grinder is suitable for light tool and miscellaneous grinding. A 6-in. wheel is used. Models are

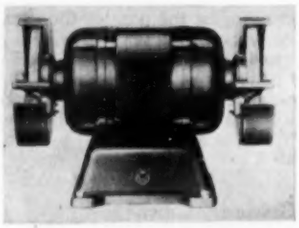


made for operation on 110 and 220 volts, single phase; 220 volts, 3 phase; and 115 and 230 volts, d.c.

Grinders, Bench and Pedestal

Skilsaw, Inc., 3310 Elston Ave., Chicago, Ill. (Vol.79, p.382.)

A line of bench and pedestal grinders and combination grinder-buffers, both bench and

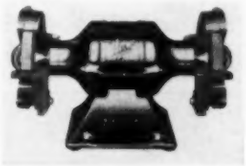


pedestal types, has been added. Motors in the bench grinders range from 1/6-hp., to 1½-hp. Models carry wheels from 6 to 10 in.

Grinder, Bench

Hisey-Wolf Machine Co., Cincinnati, Ohio. (Vol.79,p.442.)

A 1/3-hp. double-end, motor-driven bench grinder is suitable for many light tool and miscellaneous grinding jobs. Wheels

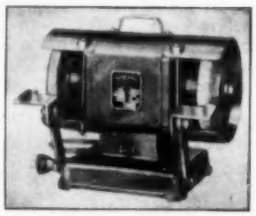


7x¾ in. are used. The control switch is conveniently located in the front of the base.

Grinder, Bench

Diehl Mfg. Co., Elizabethport, N. J. (Vol.79,p.837.)

A flat face on the motor housing permits the grinding of increased work lengths. This grinder is easily portable. Wheel guards are adjustable to permit work over the entire circum-



ference of the wheels. Toolrests may be set in any grinding position. This grinder is furnished with two grinding wheels, 6x¾ in., one coarse grain and the other fine.

Grinders, Bench, 7-In.

Delta Mfg. Co., 620 E. Vienna Ave., Milwaukee, Wis. (Vol.79, p.875.)

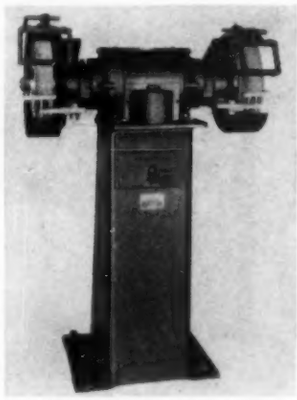
The line of 7-in. general purpose grinders is offered in three models; a pedestal model for general machine shop and toolroom work, available with either single-phase or three-phase motors, a bench model with a single-phase motor, and a belt-driven model. The twin-light safety shield not only protects the operator's eyes from flying particles of abrasives, but

also incorporates a lighting system that makes the grinder completely self-contained, portable and independent of the shop lighting system.

Grinder, Pedestal, Type 896

Production Equipment Co., 5219 Windsor Ave., Cleveland, Ohio. (Vol.79,p.220.)

The brackets are designed for use with three different lengths of extension housings, the shortest for two-bearing machines, the medium and the longest for

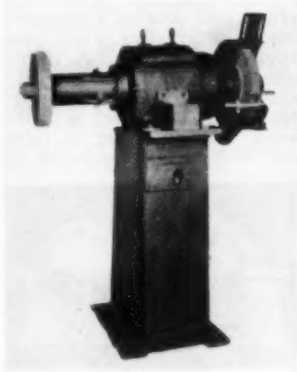


four-bearing designs. Distance between wheels for the various machines range from 21 to 42 in. Ratings are from 1 to 3 hp. for use with 8, 10 and 12-in. wheels.

Grinder and Buffer, Type 885

Production Equipment Co., 5219 Windsor Ave., Cleveland, Ohio. (Vol.79,p.377.)

This machine consists of a three-bearing grinder and buffer. The standard assembly places the buffer on the left. The grinding end has a welded-



steel guard with exhaust connection, hinged end cover, and adjustable toolrests.

Grinder, Pedestal

Ransom Grinding Machine Co., Oshkosh, Wis. (Vol.79, p.412.)

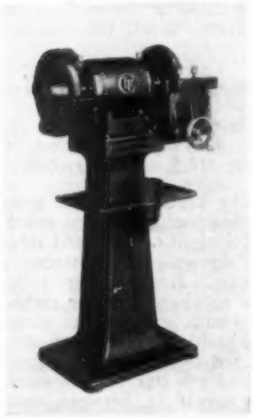
After wheels have been worn down to approximately 7 in. in diameter, they are transferred to

this machine for further use. Distance between wheels is 42 in. Adjustable rests can be provided.

Grinder and Cut-off Machine

Cincinnati Electric Tool Co., Cincinnati, Ohio. (Vol.79, p.413.)

The machine carries a 10x⅛-in. abrasive cut-off wheel on the right side and the material is fed by means of a hand screw. The vise may be tilted to 15 deg.

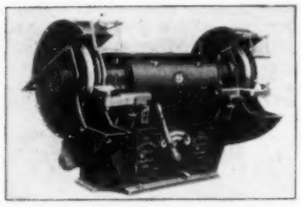


Stock up of 1-in. can be cut. The left-hand side of the machine is equipped with an 8x1-in. grinding wheel. An adjustable toolrest is mounted on the wheel guard.

Grinder, Floorstand, Model 65

U. S. Electrical Tool Co., Cincinnati, Ohio. (Vol.79, p.667.)

The adjustable-speed Model 65 is equipped with a patented gear-drive transmission. Four wheel speeds are quickly available, controlled by gearshift

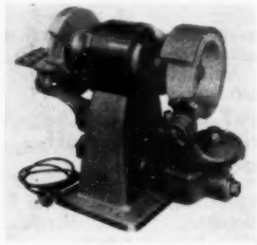


lever. With this drive an efficient peripheral speed can be maintained as the wheels wear down. The grinder is available in 3-hp., 12-in., to 15-hp., 30-in. sizes.

Grinder, Chaser, Model 0

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.505.)

This grinder is suitable for grinding all Landis diehead chasers up to 1¼ in. in width. The right-hand side of the machine is fitted with a fixture for

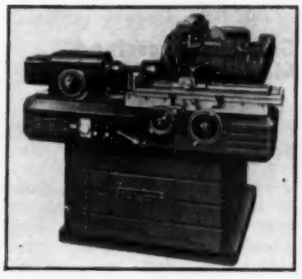


grinding the rake and lead angles. Means are provided for swiveling the fixture. The rotatable spindle permits oscillating the chaser against the face of the cup wheel. A cross feed is obtainable through a hand knob on the left side.

Grinder, Thread, Precision

Ex-Cell-O Aircraft & Tool Co., 1200 Oakman Blvd., Detroit, Mich. (Vol.79,p.648.)

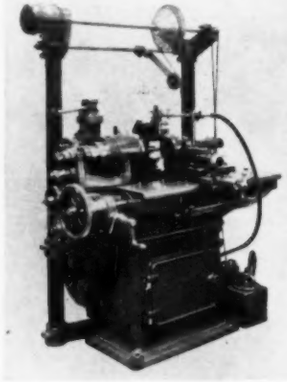
The precision thread grinder is designed for wet grinding either right or left-hand threads on screws, taps, chasers and worms. Eccentrically relieved taps or chasers, either right- or left-hand continuous threads, and multiple threads can also be ground by the use of a suitable indexing fixture. This machine takes 5x18 in. between centers. Wheel spindle may be swung in a vertical plane to 15 deg. in either direction. Threads can be ground on heat-treated work from the solid blank, holding a tolerance on the lead not to exceed 0.0002 in. error per in. in length. To the work drive spindle is attached an interchangeable master leadscrew which is selected to suit the pitch required by the customer. A work-positioning and backlash device is used on this machine.



Grinder, Thread

Triplex Machine Tool Corp., 125 Barclay St., New York, N. Y. (Vol.79,p.506.)

A motor-driven, toolroom-type thread grinder made by the Societe Genevoise D'Instruments de Physique is for finish grinding high precision screw threads for external and internal gages and taps and hardened production thread parts. There are six work head speeds and eight wheel spindle speeds. Provided with a correcting device



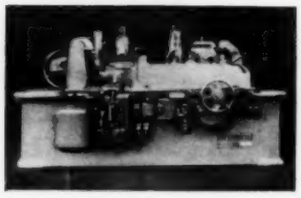
on the front, a large leadscrew enables the obtaining of an accuracy of leadscrews to plus or minus 0.0001 in. A microscope provides a means for controlling the profile angle of the wheel and work-piece.

This machine can be used for grinding outside threads from ⅛ to 6 in. in diameter and up to 12 in. in length between centers. The grinding capacity for inside threads is from 1¼ to 5 in. inside diameter.

Grinder, "Cam-O-Matic"

Norton Co., Worcester, Mass. (Vol.79,p.657.)

The "Cam-O-Matic" grinder automatically and successively grinds each cam on a camshaft, trues the grinding wheel, and stops for reloading. A timing unit causes each cam to make exactly the same number of revolutions in contact with the wheel and the latter to leave the work upon completion of grinding at the nose of the cam. A work-drive unit provides a speed range of from 12 to 75 r.p.m., which is suitable for either roughing or finishing. The machine is electrically controlled and hydraulically operated.

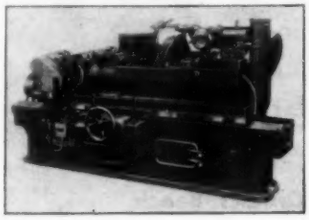


Grinder, Cam, Semi-Automatic

Landis Tool Co., Waynesboro, Pa. (Vol.79,p.733.)

Built for camshaft grinding, the 5-in. Type D grinder achieves its accuracy through machine-timed rather than manual-timed operation. Six sizes are available. A short bed known as the 30-in. may be equipped with either 26- or 30-in. work cradle and swivel table. A long bed known as the 40-in. may be equipped with either 26, 30, 36 or 40 in. work cradle and swivel table.

Provision is made for timing so that the cams may be ground in perfect relation to the



keyway or flange. The master cam operating in contact with the cam roller gives the swinging motion to the table as the master revolves. The piston actuated by hydraulic power swings the cradle away from the roller when indexing from one cam to another.

A 24-in. diameter grinding wheel is used. There is an oscillating movement to the wheel spindle, the length of the stroke being variable from 0 to ½ in.

Grinder, Crankpin, Type D-86

Norton Co., Worcester, Mass. (Vol.79,p.656.)

The D-86 crankpin grinder for automotive crankshafts requires but two levers and one handwheel for operation. One lever controls the work rotation, the opening and the closing of the workholders, the rapid and slow traverse of the wheel unit up to or away from the work and the rapid movement of the table from one pin to another. The second lever is used for "jogging" of the table to bring the pin being ground in line, and the handwheel is used to feed the grinding wheel into the work, size being obtained by a gage. Another feature is the "Lo-Rest," an hydraulically operated steadyrest. The machine is a double-head type.

Grinder, Condenser-Drum

Diamond Machine Co., Providence, R. I. (Vol.79,p.253.)

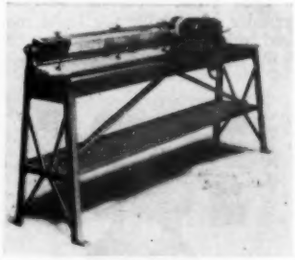
This special machine grinds eight circumferential welds on a refrigerator condenser drum. Four 14-in. wheels are driven by a single 20-hp. electric motor through V-belts. Four welds are ground in each of two steps. Wheel spindles are mounted at the end of ver-

tically swinging arms, so that they may be raised or lowered from the work. The pressure of wheels on the work is governed by hydraulic means. The drums are held from the inside by a pneumatically expanded mechanical chuck.

Grinder, Knife

Samuel C. Rogers Co., 191-205 Dutton Ave., Buffalo, N. Y. (Vol.79,p.251.)

The "Junior" knife grinder is available in three sizes; 61, 76 and 84 in. in length. The carriage with grinding wheel and motor is traversed by wheel,

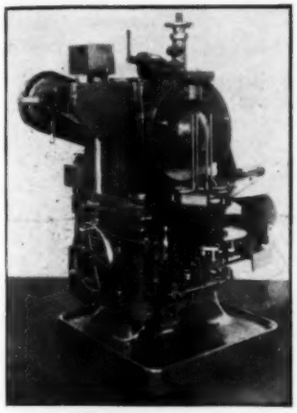


rack and pinion. Cross feed is effected by a small handwheel for moving the motor base. The steel motor plate is swiveled for straight or concave bevel grinding.

Grinder, Piston-Ring

Arter Grinding Machine Co., Worcester, Mass. (Vol.79, p.708.)

The wheel spindle is positioned eccentrically in a quill. The wheel is fed down into the work by rocking the quill. Feed is under cam control, there being



a rapid lifting movement off the work in each cycle, as well as a fast approach to the work, a slow grinding feed, and a dwell against the positive stop. Rings are positioned in a vertical magazine and carried by a plate to the constantly revolving magnetic chuck. An automatic switch is provided for the chuck.

Grinder, Shear Blade, No. 75

Bridgeport Safety Emery Wheel Co., Bridgeport, Conn. (Vol.79,p.653.)

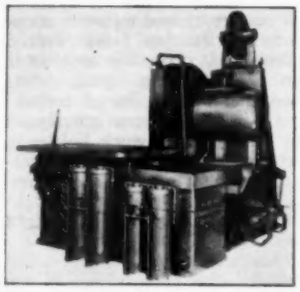
Accurate grinding of flat surfaces, either by holding the work to the table in a special fixture or on magnetic chucks, is the function of the No. 75 grinder. The center section is a double-face, center-controlled, revolving magnetic chuck for holding

flying shears and other knives with bevel edges. For grinding long squaring shears the revolving bar is lined up with the angle bar sections on the ends of the table. Table travel and movement of the wheel to the work are controlled by the hydraulic unit.

Grinder, Snagging, Table-Type

Bryant Machinery & Engineering Co., 400 W. Madison St., Chicago, Ill. (Vol.79,p.537.)

In the heavy-duty grinder designed to snag gates and risers on manganese steel and gray-iron castings built by Kling Bros. Engineering Works, Chicago, Ill., and sold by the above concern, the work is fastened to a T-slotted, horizontal worktable which travels parallel to the face of the wheel under hydraulic power. The wheel is operated in a vertical plane by hydraulic power. Feed of the

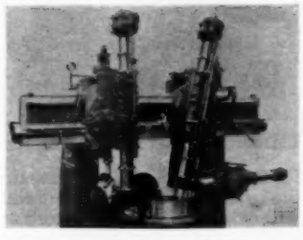


work is accomplished manually. The work table measures 36 in. x 48 in. and has a power travel of 24 in. It is also provided with a 7 in. manual crosstravel or feed for bringing the work into contact with the wheel. The motor is rated at 30 hp., 900 r.p.m. The wheel is 40 in. in diameter, 5 in. face and 12 in. bore.

Grinder, Vertical, Special

Niles Tool Works Co., Hamilton, Ohio. (Vol.79,p.382.)

The vertical grinder recently installed in the plant of the Timken Roller Bearing Co., Canton, Ohio, is said to be the largest of its kind ever built. This machine weighs 105,000 lb., and stands 18 ft. 6 in. above the floor. It grinds the large cups and cones used in heavy-duty Timken bearings. The machine is set up to grind units up to 65 in. outside diameter and 36 in. high. It carries a magnetic chuck 66 in. in diameter. Two vertical spindles approximately 12 ft. long, each driven by a



25-hp. motor at 1,200 r.p.m. and one horizontal spindle driven by a 5-hp. motor, at 1,800 r.p.m., enable the three surfaces to be ground at one setting.

Grinding Attachment, Tap-Chaser Rake

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.251.)

The attachment is for use in regrinding or sharpening the chasers used in Landis Style LT and Style LM receding chaser collapsible taps. The base is adapted for fastening to

the table of most makes of tool and cutter grinders. The swivel bracket is adjustable in a horizontal plane, and bottom part is graduated. A vise base is clamped to the swivel bracket and holds the chaser. The attachment is also suitable for Victor collapsible and receding chaser taps.

Grinding Attachment, Tap-Chaser Throat

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.380.)

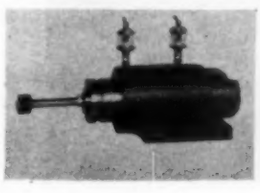
This tap-chaser throat grinding attachment is for use in regrinding the throat or chamfer on Landis collapsible tap chasers. The base of the attachment is arranged for bolting to the table of most standard makes

of tool and cutter grinders. A swivel base carries the spindle to which is attached the vise base for holding the chaser. The vise base is adjustable for setting the chasers on a radius corresponding with that of the thread which they are to cut. It is graduated for diameters from 1 to 1¾ in.

Grinding Wheelhead, Internal

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79, p.249.)

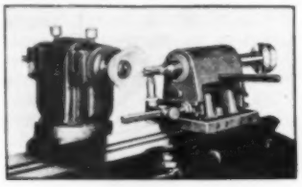
The internal grinding fixture or wheelhead is designed for production grinding of holes of various diameters and depths on the No. 2, 3 and 4 universal grinders. The spindle runs at 12,000 r.p.m. Wheel arbors are available up to 1 in. diameter and 5 in. length.



Sharpening Fixture, End-Mill

Weldon Tool Co., 321 Frankfort Ave., Cleveland, Ohio. (Vol.79,p.906.)

This end-mill sharpening fixture is adaptable to all types of fast steep spiral end mills as well as slow spiral types. The fixture will handle left- and right-hand spirals. No centers or lead cams are necessary. The rocking head permits an end



mill to be moved away from the wheel during grinding without changing the machine setting, and a guiding finger contacts the inner side of the flute in such a way that it revolves the mill only when the cutter is rotated against the spiral. Since the guide finger itself is mounted on the rocking member, there is no risk of its losing contact with the flute. Only a single pass is needed to produce uniform and accurate back-off.

The guiding finger is fully adjustable for all sizes of straight-shank end mills from ¼ to 2 in. flute diameter.

Control for Swivel-Table Grinders

Systematic Co., 709 S. 36th St., Milwaukee, Wis. (Vol.79, p.570.)

The Malsack grinder control is applicable to any plain or universal grinder used for external cylindrical grinding. The usual coarse scale, with which all grinders of this type are regularly equipped, is supplemented by a dial indicator reading in thousandths. This indicator is located at the end of the swivel table adjacent to the scale. A chart is supplied for each grinder to enable the operator to make the adjustment quickly.

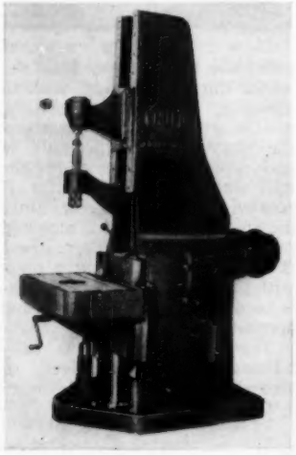
A swivel table grinder equipped with this indicator and chart requires the operator to take only a preliminary cut and two measurements, one at each end of the work, refer to the chart and then swing the table as many thousandths as shown by the chart. The amount of table movement can be gaged by means of the indicator. No computations need be made.

HONING AND LAPPING MACHINES

Honing Machine, Vertical

Hutto Machine Division, The Carborundum Co., 515 Lycaste Ave., Detroit, Mich. (Vol.79, p.696.)

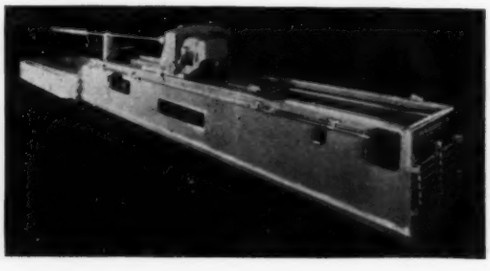
A considerably refined model of the V-300 series of honing machines is shown. The machine is of the vertical, single-spindle type and reciprocation is by crank with hydraulically-controlled, variable, hydro-mechanical drive. The machine is equipped with a mechanical lift-out for withdrawing the hone from and inserting it into the bore. The rotation speeds are infinitely adjustable within a specified range by means of a variable-speed V-belt drive mechanism.



Honing and Lapping Machine Model MH-1800-H

Hutto Engrg. Co., Detroit, Mich. (Vol.79,p.569.)

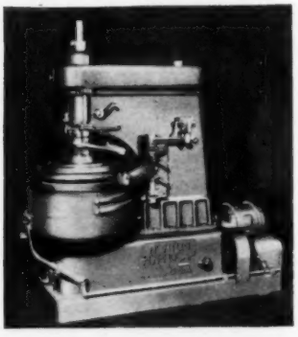
The reciprocating stroke ranges from 2 in. to 13 ft. 6 in., with infinitely variable reciprocating speeds from 0 to 50 ft. per min. This motion is produced hydraulically and transmitted through gearing. Rotation speeds for honing and lapping operations are infinitely variable from 53⅓ to 252 r.p.m. Operation is completely automatic with an electric stroke counting and controlling device, adjustable from 1 to 999 cycles reciprocation. Internal diameter, 1½ to 2 in.; over-all length, 27 ft. 11 in.; over-all width of bed, 4 ft.; weight, 24,000 lb.



Lapping Machine, "Hyprolap"

Norton Co., Worcester, Mass. (Vol.79,p.657.)

The "Hyprolap" machine is hydraulically operated and designed for high-production lapping of flat work up to 6 in. across its longest dimension. Laps 24 in. in diameter rotate in opposite directions and at different speeds. Work travels



in a circular path between the two laps. Two hydraulic cylinders raise and lower the upper lap and also provide pressure to the work during lapping. Drive is by V-belt through a clutch and brake.

Lapping Machine, No. 10-U

Norton Co., Worcester, Mass. (Vol.79,p.654.)

This machine is equipped with two cast-iron laps, the lower one revolving and the upper one being free to float. Two speeds of the lower lap and work are provided. Flat work pieces lie in adapters which are rotated between a disk driven by three pins and an oscillating split ring. The result of this arrangement is that the work pieces are caused to move about between the lap faces with a compound, planetary motion in an ever-varying path, thus breaking up the line of travel.

Cylindrical pieces are lapped by employing a work holder to which a driving pin set off-center imparts an eccentric motion. Capacity, flat work, thickness, 3 in.; length, 3 in.; weight of machine 1,000 lb.

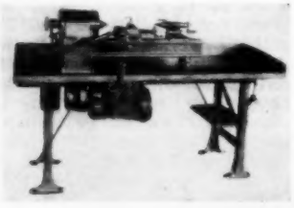
In both flat and cylindrical lapping the eccentricity of the driving pin or pins is adjustable from 0 to ¾ in. Upper and lower laps are interchangeable to permit reversing them periodically to maintain flat faces on both laps. A convenient lever operates the switch that controls the motor and brake.

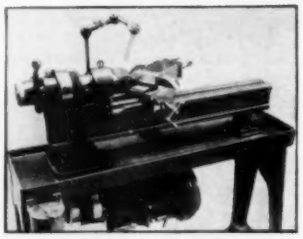
LATHES

Lathes, Bench, No. 505

Rivett Lathe & Grinder Corp., Brighton, Boston, Mass. (Vol. 79,p.712.)

In the inclosed-head design the machine is equipped with Timken precision roller bearings and maximum spindle speed is 2,000 r.p.m. An endless flat belt drive gives 18 spindle speeds, forward and reverse. Hand



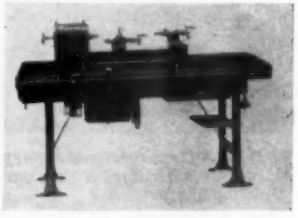


lever control and automatic brake are fitted. The open-head ball-bearing lathe operates at 4,600 r.p.m. The motor-driven automatic universal slide-rest is designed to turn automatically any desired angle. Tungsten-carbide or diamond cutting tools can be used.

Lathe, Inclosed-Head

Rivett Lathe & Grinder Corp., Brighton, Boston, Mass. (Vol. 79,p.61.)

A bench lathe of inclosed-head design has a hinged cover giving access to the cone pulley. Unit is offered with 6, 12 or 18 selective forward or reverse speeds in steps from 200 to



3,000 r.p.m. At a touch of the hand or body of the operator the speedbox lever disengages and flies to neutral, and an automatic brake instantly stops the driving cone pulley without stopping the motor. The headstock spindle is of 1-in. collet capacity. The drive consists of a standard ¾ hp. motor carried on a swing plate mounted on cork insulation. Distance between centers, 17 in.; swing, 8 in.; floor space, 72x26 in.

Lathe Attachments, Bench

Wade Tool Co., Waltham, Mass. (Vol.79,p.745.)

A hand screw machine is made by substituting a turret for the tailstock and a double cross-slide for the compound slide rest. For instant action in gripping the stock, a lever closer is fitted to the draw-in spindle.

The turret attachment has tool holes ⅝-in. diameter. Stops index automatically. Working travel is 3 in.; indexing travel is 1¾ in.

The double cross-slide has a movement of 2 in. and uses standard toolposts or circular form tool holders. It is provided with adjustable stops.

Lathe, Bench, Precision, 9-In.

South Bend Lathe Works, South Bend, Ind. (Vol.79, p.932.)

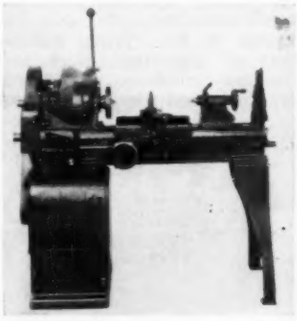
The 1936 Model 9-in. back-geared lathe is for small-piece production jobs, tool-making and instrument making. There is a twin gear reverse for right- and left-hand screw threads,

and also automatic longitudinal feed to carriage. Eight different models are available, six bench and two floor leg, supplied in bed lengths of 3 ft., 3½ ft., 4 ft., and 4½ ft. Six spindle speeds are 39 to 630 r.p.m.

Lathe, Cone-Head, Motor-Driven

Sebastian Lathe Co., Cincinnati, Ohio. (Vol.79,p.476.)

Cone-head motor-driven lathes swing, 12¼ in.; length of bed, 4 to 20 in. are single backgeared, providing six speeds. The apron is provided with a friction feed as well as a bevel-gear feed for



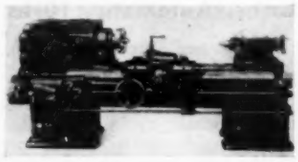
longitudinal feeds. Start, stop and reverse of the lathe are through a drum-type safety reversing switch.

Specifications of lathe shown, swing 12¼ in.; length of bed, 4 ft.; distance between centers, 22½ in.; hole through the spindle, 1⅞ in.; swing over the carriage, 8⅜ in.; collet capacity, ⅞ in.

Lathe, "Hydratrol"

Lehmann Machine Co., St. Louis, Mo. (Vol.79,p.600.)

The pulley driveshaft of the "Hydratrol" lathe carries three hydraulically operated friction clutches. One of the clutches provides eight reverse speeds and the other two the initial speed progression for sixteen forward speeds. A conventional gear arrangement has three hydraulically operated external and internal gear type double positive clutches to complete the sixteen spindle speeds which are in almost exact geometrical pro-

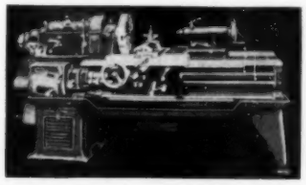


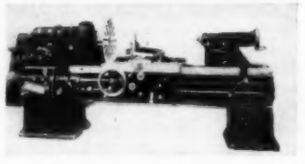
gression. These positive clutches require no adjustment and provide ample capacity, 25 hp. on 16- and 18-in. and 40 hp. on 22- or 24-in. sizes. Speed changes are effected by turning a three-lever handle on the front of the headstock. This may be turned, without intermediate stop, to any speed desired. There are two hydraulic brakes, one at the primary power source and one at the spindle. The latter is provided to prevent overrun.

Lathes, Toolroom and Heavy Duty

Cincinnati Lathe & Tool Co., Oakley, Cincinnati, Ohio. (Vol. 79,p.671.)

The 18-in. by 8-ft. toolroom lathe has the motor mounted inside of the leg. This machine is fitted with an oil pan and pump, and taper and nose-type draw-in attachments. The other machine, a 22-in. x 10-ft. geared head, heavy-duty lathe is fitted with a special double rest per-





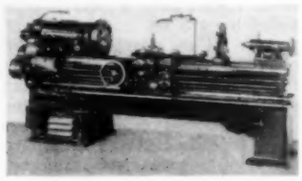
mitting a series of cuts to be taken simultaneously with a number of cutting tools. A quick-change gearbox gives 32 to 96 changes by simply shifting two levers, and without the use of an auxiliary quandrant. Twelve spindle speeds are obtained in geometric progression by shifting three levers.

Lathe, Toolroom, Model B

Reed-Prentice Corp., Worcester, Mass. (Vol.79,p.743.)

Equipped with sixteen spindle speeds and 49 changes of feeds and threads, the 14-in. precision lathe has speed changes obtained through sliding gears. Clutch and brake control for the spindle are operated from both the head end of the lathe and from the apron. Separate clutch control in the apron is provided for longitudinal and cross feeds.

Specifications: swing over bed ways, 16½ in.; distance between

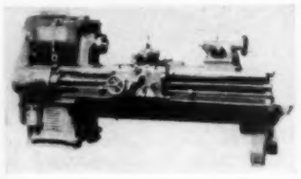


centers, 30 in.; range of spindle speeds, 18 to 536 r.p.m.; range of threads per inch, 1½ to 96; range of feeds in thousandths per rev., 2½ to 160. Lathes of similar construction are also available in 16-, 18- and 20-in. sizes.

Lathe, Engine, Geared-Head

Greaves-Klusman Tool Co., Cincinnati, Ohio. (Vol.79, p.775.)

The Timken-equipped geared-head engine lathe is made in four sizes; 16 in. x 6 ft., 18 in. x 6 ft., 20 in. x 8 ft., and 22 in. x 8 ft. The rear V is dropped to the level of the front flat, giving additional turning capac-



ity. A new form of nose is used on these machines. The small diameter is ground standard and allows the operator to slip on face plates or chucks easily. The threaded diameter provides an extra large shoulder area for squaring the face plates. The arrangement of the gears in the geared head is similar to the sliding gear transmission used in automobiles. Drive motor is mounted on a machined plate in the cabinet leg.

Lathe, Engine, Heavy-Duty, 20-In.

Springfield Machine Tool Co., Springfield, Ohio. (Vol.79, p.837.)

Designed to take heavy cuts with high-speed steel and high-speed cuts with tungsten-carbide, this heavy-duty, 20 in. ball-bearing, geared-head engine lathe has a sixteen-speed head-

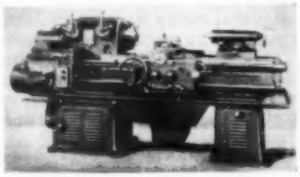
stock of massive design with either helical or spur-gear trains. Reversing mechanism for the leadscrew mounted on the rear of the headstock allows much heavier gears and shafts to be used. A heavy-duty gearbox is attached, giving 36 changes of threads and feeds, including 11½. Weight of machine with 10 ft. bed is approximately 9,000 lb.

Lathe, Engine, Model C

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.868.)

The Model C Lathe is available in two sizes, having 14- and 16-in. swings. Each size can be had in two lengths. Headstock gearing produces eighteen spindle speeds, ranging in geometric progression from 14 to 1,000 r.p.m. The "column headstock" provides a solid support to the driving pulley and takes the pull of the belt.

The spindle is supported at three points. Nose is of the new

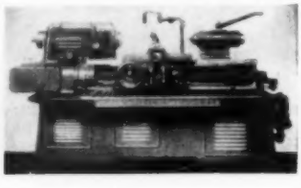


Type D-1 and is flanged. A set of ratio gears provides for 60 quick changes of feed ranging from 0.003 to 0.188 in. It also provides for 60 quick thread changes from 1 to 60 threads per in. A synchronizing high-speed clutch mechanism in the headstock reverses the leadscrew and feedrod drive. The same quick-withdrawing mechanism for thread-cutting which has been known in the Model B lathe is incorporated. Compound rest is of similar design. Centralized oiling is used throughout.

Lathe, Engine, High-Speed

Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. (Vol.79,p.938.)

Spindle speeds infinitely variable between 400-2400 r.p.m. as the minimum, or 600-3600 r.p.m. as the maximum, are secured through a New Departure variable-speed unit. Four ranges of feeds may be had in the built-in apron, although only one range is furnished with the machine. Swing over the bed is 16½ in., over compound rest and carriage, 10⅛ in., and over the compound rest and rear-con-



nected rest, 8⅝ in. Distance between centers is 30 in. Hole through the spindle is 1 5/16 in. The headstock and feed mechanism are equipped with automatic lubrication.

Lathe, Shaft-Turning

Monarch Machine Tool Co., Sidney, Ohio. (Vol.79,p.737.)

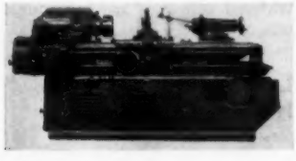
The 18-in. Model "BB" lathe driven by a 20-hp. motor was developed for shaft turning, using cemented carbide tools at spindle speeds as high as 2,000 r.p.m. This lathe is the regular standard Monarch 18-in. lathe, except the head-stock and the drive. The geared speed-change

unit is mounted inside the cabinet leg and provides sixteen changes of spindle speeds with a normal range from 50 to 2,000 r.p.m. in geometric progression. This lathe is equipped with multiple length feed stops, and with the Monarch Microgaging method for quickly setting diameters.

Lathe, Step-Turning

Hendey Machine Co., Torrington, Conn. (Vol.79,p.928.)

Designed for production turning at highest effective speeds, using the most efficient cutting tools known to the industry, the No. 3 "Hi-Speed" step-turning lathe is powered by a New Departure Transitorq coupled to an electric motor of 5 to 10 hp. Power transmission to the spindle is through a multiple V-belt

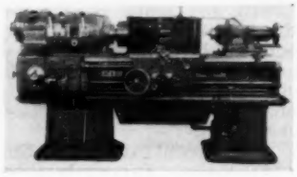


drive. Variable speed unit is mounted at the end of the feed box below the headstock. Five-section multiple dials provided for the feed screw allow repeated settings of the tool for different diameters. The spindle is bored to take 1½-in. bar. Swing over the ways is 16½ in.; swing over the carriage is 8½ in. Two lengths of bed are: 42 and 66 in. between centers.

Lathe, Manufacturing, No. 4C

Hendey Machine Co., Torrington, Conn. (Vol.79,p.928.)

A heavy-duty engine lathe for manufacturing and maintenance operations, the No. 4C has twelve spindle speeds in geometric progression, ranging from

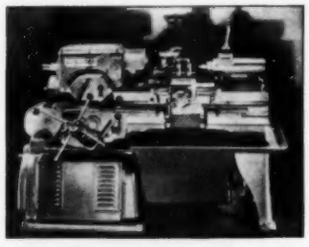


30 to 1,200 r.p.m. Power is provided by a 5 hp. constant-speed motor. The gearbox has 28 changes of thread and feed through a seven-gear cone and a primary four-speed change. This combination gives a normal thread cutting range of 2¾ to 40 threads per in. Leadscrew is driven from the gearbox through a positive-tooth clutch.

Lathe, Manufacturing, Type T

Monarch Machine Tool Co., Sidney, Ohio. (Vol.79,p.737.)

This 12-in. lathe is designed to handle the smaller classes of production jobs where a hand return to the front carriage is desirable. It is equipped with automatic length-feed stops, and can be furnished with multiple automatic length-feed stops.



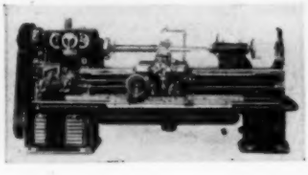
Monarch Micro-Gage method of tool setting is incorporated in the machine.

The lathe, built to use the cemented carbide tools, can be furnished with special tooling to perform a wide variety of single- and multiple-tool manufacturing operations. Swing over ways, 12½ in.; over carriage, 7 in.; distance between centers can be 18 in.; base length, 30 and 42 in.

Lathe, Multi-Production

American Tool Works Co., Cincinnati, Ohio. (Vol.79,p.650.)

The multi-production lathe fills the gap between the standard engine lathe and the highly specialized automatic lathe. Through its combination of automatic length stops, positive diameter stops, and special tooling it offers the advantages of very rapid production of duplicate parts. Multi-production features consist primarily of a

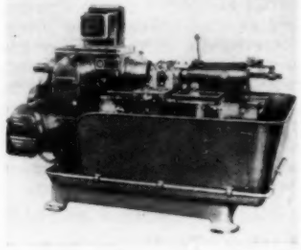


highly developed automatic longitudinal stop mechanism, a set of positive, hand-operated diameter stops, and tool rests especially adapted to the work.

Lathe, Automatic, 10-In.

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.79,p.660.)

This 10-in. "Stub" lathe has an automatic cycle which includes rapid approach, feed into depth, turn, face, tool relief if desired, quick return and stop. Four groups of spindle speeds are available. Standard lengths



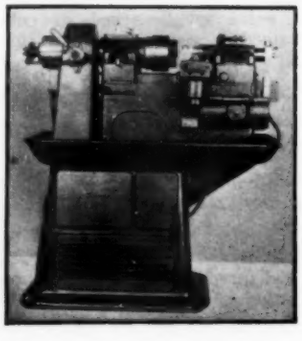
between centers: 16, 22, 34 and 46 in. Speeds, feeds and carriage movements can be adjusted in a few minutes to meet the requirements of the wide variety of work pieces. The front tool-slide has micrometer adjustment. The front carriage may have an automatic feed-in attachment and an automatic tool release.

Lathe, "Lo-Swing Imp"

Seneca Falls Machine Co., Seneca Falls, N. Y. (Vol.79, p.700.)

This model has the speed of the bench lathe, plus the rigidity and automatic operation of an automatic lathe. It is especially applicable to work on bushings, pistons, valves, bearings and other small parts. The spindle is capable of speeds up to 5,000 r.p.m.

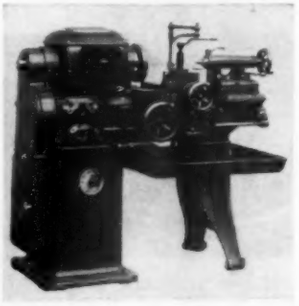
The carriage is driven by a drum cam operated in turn by a worm and worm wheel. Variations in feed are obtained through pick-off gears. The cross feed is operated from a second path cut in the carriage feed cam, thus maintaining a positive time relation between the longitudinal and cross feed carriages. The Lo-Swing Imp is adaptable to chucking or between-center work.



Lathe, High-Speed, 11-In.

R. K. LeBlond Machine Tool Co., Cincinnati, Ohio. (Vol.79, p.664.)

The 11-in. high-speed production lathe takes full advantage of tungsten and tantalum-carbide tools. Direct mounting of the dynamically balanced motor on the lathe spindle gives a vibra-



tionless delivery of power. The lathe can be furnished with speeds of 450, 600, 900, 1,200, 1,800 and 3,600 r.p.m. Feeds 0.001 to 0.014 in. Across-the-line starting brings the machine up to full speed in 2 sec., and electric plug stopping stops it in 2½ sec.

Lathe, Automatic, Hydraulic

Porter-Cable Machine Co., Syracuse, N. Y. (Vol.79,p.673.)

Built for the manufacture of small- and medium-size parts, the "Carbo" hydraulic lathe has a full automatic cycle. It is designed for the efficient utilization of high-speed steel and tungsten-carbide tools. Parts are duplicated within very close

limits because of the accurate automatic setting of all tool-slides at the start of each cycle.

Spindle speeds, 95 to 1,130 r.p.m. with low-speed heads, 167 to 1,978 r.p.m. with high-speed heads. Distance between centers, 18 in.; swings 14 in. over the ways, 7 in. over the carriage; feed, 0 to 24 in. per min.

Quick-Return for Carbo-Lathe

Porter-Cable Machine Co., Syracuse, N. Y. (Vol.79, p.412.)

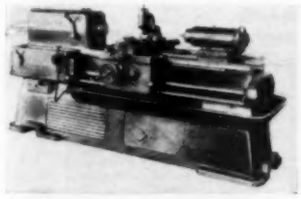
An electric quick-return for the carriage, also the facing attachment, is offered for the Carbo-Lathe. It consists of a separate electric motor attachment which is fastened to the

end of the lathe bed. It is connected to the feed shaft by a flexible coupling. Power is supplied by a ½-hp. motor. A spring-loaded disk clutch is built into the gear drive, will just drive the carriages, but if the power feed of the table is engaged and the motor is started, the clutch will slip.

Lathe, Production, "Speedcut"

Seneca Falls Mach. Co., Seneca Falls, N. Y. (Vol.79,p.735.)

The "Speedcut" lathe is designed for single-point turning or modified multiple-tool turning with carbide or other tools. The spindle is driven direct through V-belts from either a variable-speed motor or a New



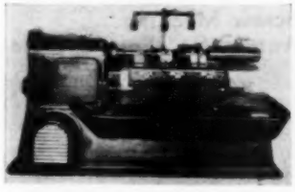
Departure Transitorq. Spindle speeds up to 3,600 r.p.m. are available.

The carriage feed mechanism is driven through V-belt to pick-off gears. Three quick changes of feed provide a range of 0.001 to 0.060 in. "Speedcut" is available with or without rapid traverse and automatic rapid traverse to the carriage. Swing, 18 in. over the ways; weight, approximately 6,000 lb.

Lathe, Model "U" Lo-Swing

Seneca Falls Machine Co., Seneca Falls, N. Y. (Vol.79, p.700.)

The Model "U" Lo-Swing is built in two bed lengths, 12 in. and 36 in. centers, each size having a 5-in. swing. It is designed for turning pistons, bushings, stem pinions, steering knuckles and other short cylindrical work and can be used for both straight turning and for forming, or for a combination of both. The lathe is completely automatic in operation. Pick-off gears are provided for changing both speeds and feeds.

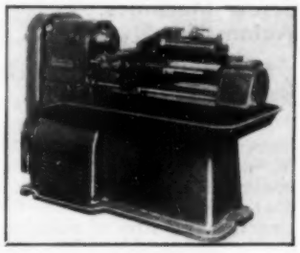


Cams operate the longitudinal and cross-feed movement of the carrige slide, as well as the cross-feed movement of the rear forming and squaring slide.

Lathe, Manufacturing, "Unitlathe"

Seneca Falls Machine Co., Seneca Falls, N. Y. (Vol.79, p.700.)

The foundation of this "Unitlathe" is a so-called "base machine" which consists of an integrally cast bed and headstock mounted on a cabinet base that houses the motor, coolant tank and pump, and forms the chip



pan. Standardized and interchangeable functional units, assembled into this base machine when originally built, or later as required, provide a complete and versatile lathe of the type best suited to the work at hand. The No. 1 model applies the Lo-Swing method for use of carbide tools.

Lathes, High-Speed, "Duomatic," Nos. 1 and 5

Lodge & Shipley Machine Tool Co., Cincinnati, Ohio. (Vol.79, p.867.)

The No. 1 Duomatic is a highly specialized tool for high-speed quantity production of the smaller class of work pieces. A power traverse brings the tools from the out-of-the-way loading position to the ready-to-cut work position by high-speed motor. A definite relation exists between the feed and the r.p.m. of the work piece. All electrical control is a distinctive feature of this machine. Rec-

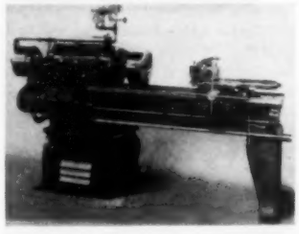
ommended motor rating is 5 to 15 hp., 1,800 r.p.m.

The No. 5 Duomatic is a heavy-duty machine. Hydraulic tool control has been built in. Feed can be automatically changed during the cut as the section of the cut varies.

Lathe, Turret

Reed-Prentice Corp., Worcester, Mass. (Vol.79,p.279.)

This 14-in. sliding-gear-head, production-type turret lathe is similar to the company's standard sliding-gear head engine lathe, except for the turret construction. Design incorporates

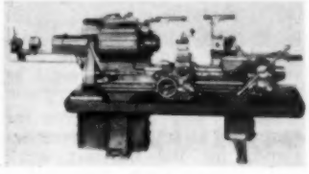


an eight-speed sliding-gear headstock with self-contained motor drive and quick-change mechanism for feeds only. The machine is equipped with power-feed bed turret with forward and reverse feeds. A three-jaw air chuck holds the work.

Lathe, Turret, No. 4

Warner & Swasey Co., Cleveland, Ohio. (Vol.79,p.477.)

The No. 4 universal turret lathe utilizes cemented tungsten carbide in addition to high-speed steel cutting tools. It has twelve spindle speeds from 30 to 751 r.p.m., and a 7½ hp. motor. A circumference binder



ring automatically clamps the turret after indexing. Travel of the turret slide is 12 in., with the power feed applied through a friction clutch. An automatic indexing square turret offers increased speed in manipulation. The rachet-type bar feed is designed for fast operation.

Lathe, Turret, No. 3

Gisholt Machine Co., Madison, Wis. (Vol.79,p.669.)

Designed for fast manipulation on light work, yet retaining the power and rigidity for the heavy work within its capacity, the No. 3 turret lathe has a bar capacity of 1⅛ in. diameter by 10 ft. length, and a chucking capacity of 9½ in. swing over the cross-slide, or

18½ in. swing over the ways. Six spindle speeds and reverse may be obtained in the normal speed range of 65 to 730 r.p.m. The cross-slide has eight power feeds, both cross and longitudinal, and reverse in both directions. The ram is of sufficient length so that in all possible working positions of the turret, it has a bearing on the full length of the saddle.

Lathe, Turret, Saddle-Type

Jones & Lamson Machine Co., Springfield, Vt. (Vol.79, p.689.)

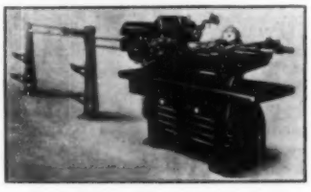
The saddle-type turret lathes are built with a 2½-in. bar capacity and are fitted with 12-in. chucks when used for chuck work. There are twelve spindle speeds forward and reverse. The main spindle is the flanged type with a taper pilot. The universal carriage is equipped with

a heavy-duty slide for mounting tools on the front and back. The apron is equipped with a sliding-gear transmission with nine variable feeds. A six-station hollow hexagon turret is located by a large taper locking pin. The saddle is equipped with a power traverse that is arranged to provide for two speeds in both directions.

Lathe, Turret, No. 1

Foster Machine Co., Elkhart, Ind. (Vol.79, p.694.)

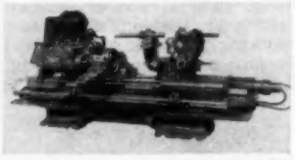
No. 1 turret lathe has a regular automatic chuck capacity of $\frac{13}{16}$ in. which may be increased to $1\frac{1}{16}$ in. The eight spindle speeds range from 300 to 3,600 r.p.m. Either hand-operated automatic chuck and bar feed, or cam-operated automatic chuck and bar feed can be supplied. The bar support tube swings forward so that a new bar may be loaded from the operator's end of the rack. The machine can be had either with lever-operated cross-slide or a combination screw and lever-operated type cross-slide.



Lathe, Turret, No. 3

Foster Machine Co., Elkhart, Ind. (Vol.79,p.694.)

A No. 3 indexing turret "Fastermatic" has a bed equipped with adjusting blocks for leveling and has nitrided hardened V-ways. There are sixteen changes in spindle speeds, arranged in four sets of four automatic changes. If desired, four automatic spindle speed changes may be made with one forward movement of



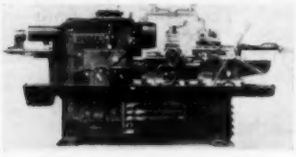
the turret, and they may be made with each face of the turret if desired.

The machine has a bridge-type cross-slide with a front and rear slide, either of which may be used in conjunction with any face of the turret. The hydraulic feeding arrangement provides a separate feed for each face of the hexagon turret.

Lathe, Turret, No. 1½

Foster Machine Co., Elkhart, Ind. (Vol.79,p.695.)

The 1½ in. universal turret lathe is designed for the new cutting alloys. Spindle speeds may be arranged either as sixteen in all, or two ranges of eight, a high range for bar work and a low range for chucking work. The automatic chuck and bar feed are hydraulically-

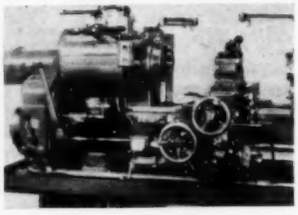


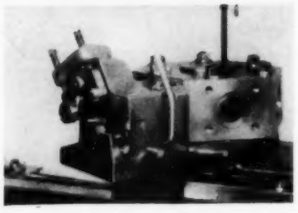
operated. The cross carriage is full universal with both cross and longitudinal feeds. The cross-slide has an adjustable stop spool which provides power knockouts for each station of the square turret. There are nine power feeds of the cross-slide and turret saddle apron. This machine is built 1½ in., 2 in., and 2½ in., round bar capacity.

Turret Lathe Improvements

Warner & Swasey Co., Cleveland, Ohio. (Vol.79,p.699.)

Among improvements are the heavy-duty cross-slide with square lock gib. The cross-slide is designed particularly for heavy cuts and coarse feeds such as are demanded by tungsten-carbide tools. The square lock gib on the right side of the





cross-slide presents a means of taking the load, for it is at all times at right angles to the load pressure.

The square turret mounted on the cross-slide is a new development. By removing the characteristic center stud through the turret, greatly improved rigidity is possible and also better facility for cramping of overhanging tools is provided for.

The leadscrew attachment is designed to overcome former shortcomings of turret lathes and to simplify this operation. The feed shaft leading to the apron of the cross-slide is utilized for the leadscrew but only that portion of the shaft which has hitherto been unused. This provides a positive thread and completely eliminates the conventional leader which must be gripped to the shaft.

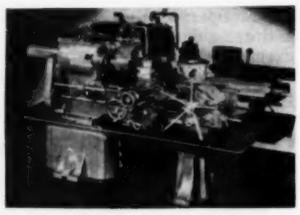
Heavy duty bar turners for ram type turret lathes were designed for the heaviest work and the coarsest feed using Stellite or carbide cutting tools. The tool rolls are so placed as to make efficient steadyrests for heavy work done from the cross-slide of the turret lathe.

Lathe, Turret, Ram-Type

Gisholt Machine Co., Madisson, Wis. (Vol.79,p.898.)

Efficient for high-production work and also for small-lot jobbing, the ram-type turret lathes are easy to operate. Their fast manipulation is partly due to the automatic labor-saving devices built-in as standard equipment. The three machines cover 1½- to 2½-in. bar capacity and 8- to 15-in. chucking capacity.

The hexagon turret and its stop roll are automatically indexed to the next position with



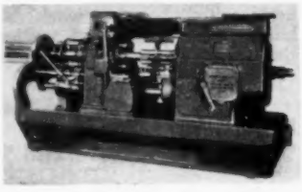
the back movement of the ram slide. Four tools are taken in the quick-indexing square turret on the cross-slide. A change in spindle speed can be secured without passing through intermediate speeds by the use of the selective gear transmission.

Screw Machines, Automatic, Six-Spindle

National Acme Co., Cleveland, Ohio. (Vol.79,p.26.)

Model "R" six-spindle automatics supplement the line of four-spindle automatic screw machines (*AM*—Vol. 78, page 358). Collets and pushers for corresponding sizes of machines are interchangeable. The six-spindle machines are built in four capacities: ⅝, 1, 1¼, and 1⅝ in.

In the arrangement or spacing of the spindles in the spindle



carrier, the two spindles at the top and the two at the bottom are in line for direct application of tooling from the four independently operated cross-slides. The two spindles at the sides (2nd and 5th positions) are accessible for a "short-coupled" double-deck toolholder or an independent cross-slide. High-speed drilling attachments can be used in any or in all six positions. Threading is done in the third or fourth positions, or both, in all sizes of machines.

Screw Machine, Automatic

New Britain-Gridley Machine Co., New Britain, Conn. (Vol. 79,p.567.)

Models 40 and 41 are of the four-spindle type, with the first built in two sizes, ⅝x5 in. and 1x5 in., while the latter is built in several sizes ranging from 1⅜x6 in. to 2¼x6 in. Models 60

and 61 are six-spindle machines, with the first built in two sizes, ⅝x5 in. and 1x5 in., and the second built in sizes to and including 2¼x6 in.

The spindle carrier is automatically lifted from its bearing seat before indexing, and is held off of its seat during the index movement. Forming slides are mounted on hardened and ground cylindrical steel studs entirely encircled by their bearings. The slides are fitted with hardened and ground tool holder bases. The cross-slides are independently operated and actuated by cams. Tool slide is actuated forward and reverse by a drum type cam. On Models 40 and 60, speeds range up to 3,800 r.p.m., while on Models 41 and 61 speeds up to 2,500 r.p.m. are available.

Screw Machine, Single-Spindle, Automatic

National Acme Co., Cleveland, Ohio. (Vol.79,p.646.)

In order to reduce the time required for restocking, provision is made for handling 20-ft. lengths of bar stock. The method of feed eliminates the

necessity for the usual pusher and pusher tube, feeding cam and roller.

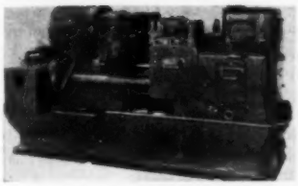
The chucking mechanism is operated by a cam drum on the headstock of the machine. Stock is fed out against the drill in most cases. When drilling is not required, a stock stop is mounted in the drilling spindle. A separate, independently cammed disappearing stock stop may be furnished as optional equipment. When changing over from one job to another, the operator can adjust the depth of hole to be drilled by turning an adjusting screw on the front of the machine, and without changing the cam.

Two cross-slides are mounted. One of these slides carries the chamfering or forming tool, the other the cut-off tool. Each slide is independently operated by cam.

Screw Machine, Automatic, Four-Spindle

Greenlee Bros. & Co., Rockford, Ill. (Vol.79,p.709.)

Two sizes take ¾-in. and 1-in. round stock, respectively. Spindle speeds are available up to

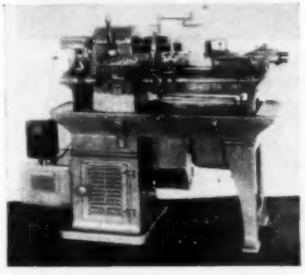


3,400 r.p.m. The machine is open in construction and accessible for the operator to get at. Live drilling spindles can be mounted in any or all of the four positions, with threading and tapping attachments in the third and fourth positions. The collet closing spools are made in three pieces and stock feeding rings are mounted on ball bearings so that they do not rotate with the spindle when the collets are being opened and closed and the stock is being fed forward. The standard Greenlee cross-slide cam construction is used on this machine. Stock feed length is 6 in. with standard turning length of 5 in.

Screw Machine, Wire-Feed, No. 1

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79,p.740.)

The No. 1 wire feed screw machine can be quickly and cheaply set up for small quantities of work. Feeding mechanism is automatically placed in operation by movement of the cross-slide as the piece is cut from the bar. Capacity: studs



up to ⅝ in. in diameter and any length to 4 in. Speed range is from 175 to 3,620 r.p.m. Feed tube capacity for light work is ⅞ in.

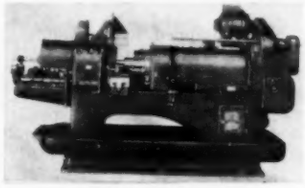
A No. 0 machine is similar in design. Capacity: ⅜-in. diameter, turning any length to 2¼ in. Speed range is 220 to 4,500 r.p.m. Feed tube capacity for light work is ⅝ in.

Bar and Chucking Machines, Multiple-Spindle

Cleveland Automatic Machine Co., 2268 Ashland Road, Cleveland, Ohio. (Vol.79,p.773.)

Made to obtain tool-room accuracy in production, the Model K multiple spindle bar and chucking machines have convenient set-up. Steel-body air chucks are operated by duplex air cylinders mounted on each spindle. Each spindle driving gear is equipped with a disk clutch mechanically operated from the camshaft to stop and start the spindle in the loading position as the spindle turret indexes. The main slides carry the tools for the lower spindles. Top slides afford extra tool positions for forming, shaving and cutting-off.

Accelerated tool spindles for

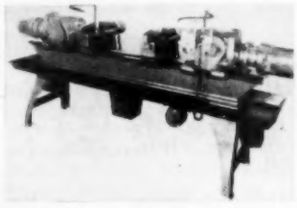


drilling, boring, reaming and threading operations are mounted in the main tool turret. Travel of the tapping spindle is controlled by a positive trip. Accessibility to tooling from front or rear and a combination tool turret affording eight or twelve tool positions are other features.

Centering Machine, "Star"

Seneca Falls Machine Co., Seneca Falls, N. Y. (Vol.79, p.701.)

The Star automatic drilling and centering machine provides high production on a continuous basis with sufficient flexibility to permit economical change over when necessary. This has been accomplished by using two

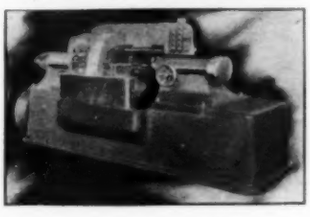


motor-driven independent heads each with its own closed cycle and independent speeds and feeds arranged to operate in timed relation to one another. Standard quick-acting, equalizing vises are available and may be arranged to operate singly or in pairs.

Lathe, Crankshaft, Center-Drive

Wickes Bros., Saginaw, Mich. (Vol.79,p.635.)

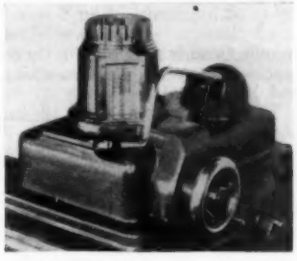
An automatic center-drive type crankshaft lathe, designated as Model C, is built for the cheeking, turning and filleting of all main line bearings, for turning and shouldering the stub end of the crank, for turning and straddle-facing the flange and turning the oil groove on 4-, 6- and 8-throw crankshafts having 3, 4 or 5 main line bearings. The rear tools are mounted on inverted cross-slides carried in the back tool housing. Weight, including electrical equipment, is 21,000 lb.



Cutting Speed Pre-Selector

Warner & Swasey Co., Cleveland, Ohio. (Vol.79,p.929).

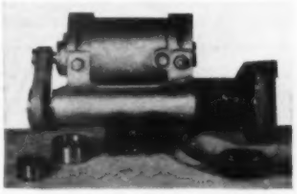
The cutting-speed pre-selector requires but one lever for operation and enables the operator to choose the proper cutting speed and feed for the next cut by the simple rotation of a handwheel. The full range of work diameters is arranged on the left- and right-hand sides of the window; the drum which rotates inside the housing indicates the proper feet per minute for each diameter in twelve vertical columns corresponding to the twelve speeds of the headstock. Formerly, the operator was required to shift three levers. A speed sequence indicator is incorporated in the form of a castellated drum on top of the device into the slots of which numerals are inserted to indicate the several speeds required on the job consecutively.



Grinder for Lathes

McGonegal Mfg. Co., Rutherford, N. J. (Vol.79,p.444.)

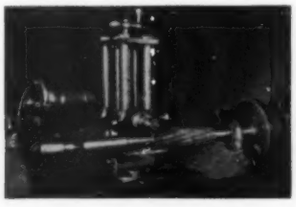
The "Thermac" grinder has a circumferentially adjustable grinding spindle, enabling the operator to set the spindle center to the lathe center in front of the motor for internal or external grinding or to the rear of the motor for large diameter external grinding. For longitudinal external grinding between centers, the extension arm can be used.



Lathe Attachment

Master Brake & Appliance Co., Trousdale, Kansas. (Vol. 79,p.347.)

The lathe converter mounts on the lathe compound rest and has its own micrometer vertical leadscrew adjustment that provides a complete combination for milling, drilling, broaching and grinding on any work piece that may be held in a lathe chuck, faceplate or between centers. It has the advantage of all lathe feeds, speeds and the use of the compound.



MILLING MACHINES

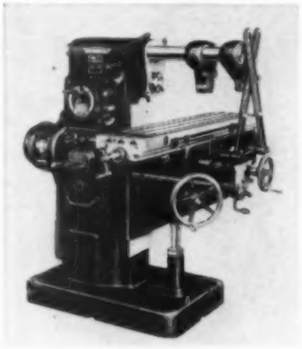
Milling Machine, Plain, No. 2

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79, p.184.)

The No. 2 light-type plain milling machine is a simplified self-contained, motor-driven unit. Spindle height has been lowered to give a more convenient height for vision of cutters and work.

The speeds are arranged in two series, giving sixteen spindle speeds from 40 to 1,300 r.p.m. Changes are made by rotating a lever on the side of the column in conjunction with a backgear and high and low-series lever. A convenient single lever feed control is also provided for the sixteen feed changes from ½ to 18¾ in. per min.

The column face has been set back approximately 4 in. from the end of the spindle to give

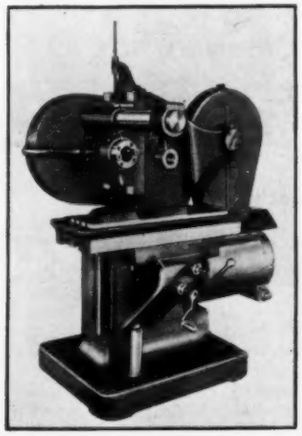


added clearance when using end mills, but also to permit cutters to be set nearer to the spindle nose. Longitudinal feed, 28 in.; traverse feed, 10 in., and vertical feed, 15 in., all automatic.

Milling Machine, Plain, No. 26

Kent-Owens Machine Co., Toledo, Ohio. (Vol.79,p.603.)

The table feed of the No. 26 milling machine is cam controlled, permitting any desired cycle of automatic table movement. A table working surface



of 36x8¼ in. with three T-slots permits the mounting of two fixtures, one of which can be unloaded and loaded while the other is under the cutter. Pick-off gears in the table feed train readily permit changing of the cam drum speed. Standard equipment permits spindle speeds to 2,000 r.p.m.

Milling Machine, Plain, No. 12

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79, p.658.)

The No. 12 plain milling machine is operated through electrical control rather than by mechanical tripping. An automatic backlash eliminator makes it possible to rotate the cutters in the same direction as the feed (climb milling) or in the conventional method (rotating against the feed). The machine will reverse in cutting feed. It is a compact production type for duplication of medium-size parts, either in moderate or long runs.

Milling Machine, Plain, Automatic

Sundstrand Machine Tool Co., Rockford, Ill. (Vol.79,p.661.)

High-speed milling on parts of business machines, household appliances, electrical apparatus, firearms, small machines, tools and the like can be done on the No. 2 automatic "Electromil." This machine has automatic electric table control and is designed to use extremely simple fixtures. Flexibility is such as

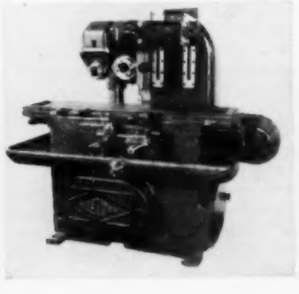
to give any combination of table cycles within the capacity of the machine. Table feeds can be varied by changing pick-off gears or by means of an 8-speed quick-change gearbox. The spindle head is available in three types—low-speed, medium-speed and high-speed.

The machine table is 12 in. wide, 35 in. from the floor line and may have either 18 or 24 in. spindle feed. Distance from the center of the spindle to the top of the table is 3½ in. minimum, 12 in. maximum.

Milling Machine, Plain, No. 28

Producto Machine Co., Bridgeport, Conn. (Vol.79, p.661.)

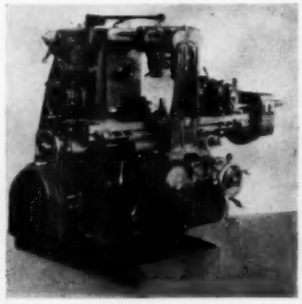
A manufacturing-type miller adapted for miscellaneous milling operations, this medium-sized machine uses pick-off change gears to obtain changes in feeds and speeds. Table return, 300 in. per min. Table feed ranges from ⅞ to 12½ in. per min. The cutter spindle bearing is adjustable vertically. Length of working surface, 43½ in.; width over-all, 11 in.; longitudinal table feed, 30 in.



Milling Machine, Plain, Model K

Kearney & Trecker Corp., Milwaukee, Wis. (Vol. 79, p. 690.)

Now equipped with duplicate front and rear control for both hand adjustment and power feed operation, the Model K machines have 24 spindle speeds in approximate geometric progression. There are 32 feeds

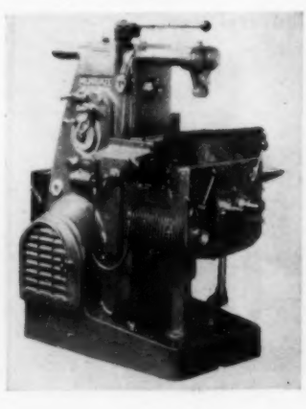


from ¼ in. to 60 in. per min. The motor is mounted crosswise of the column in order to provide a solid wall columnback from overarms to floor. Drive from the motor to the initial shaft is by multiple V-belts. The main clutch has been newly located on the outside of the drive pulley to be readily accessible.

Milling Machine, Plain, Model H

Kearney & Trecker Corp., Milwaukee, Wis. (Vol. 79, p.691.)

Designed primarily for the manufacture of small parts in large quantities such as required by small arms, screw machinery, typewriters, calculating machines and radio manufacturers, the No. 0 size of Model H manufacturing type milling machine is almost in the midget class. The distance from the center of the spindle to the floor is only 3 ft. 8 in.



Two sizes of Model H machine are available, the No. 0 with a table 10 in. wide and a feed range of 12 in. longitudinal, 3 in. cross and 15 in. vertical, and the No. 1 with width of table 12 in. and feed range of 18 in. longitudinal, 3 in. cross and 17 in. vertical.

Milling Machine, Plain, Precision

Hardinge Bros., Elmira, N. Y. (Vol.79,p.931.)

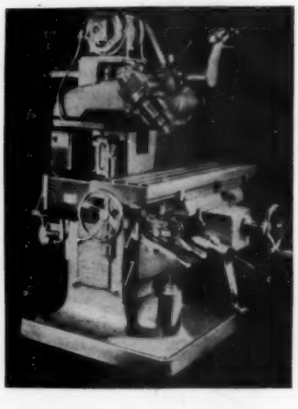
The MD5 precision milling machine has a table 24 in. by 6 in. and a working surface 20x6 in. The range is 13¾ in. longitudinal, 6 in. traverse and

7 in. vertical. Distance from the center of the spindle to the table in lowest position is 7 in. Six speeds forward and six speeds in reverse range from 120 to 1,190 r.p.m.

Milling Machines, Universal

Van Norman Machine Tool Co., Springfield, Mass. (Vol. 79,p.712.)

The No. 32 universal and the No. 22 universal have greater range and handle larger work at higher speeds than any previous machines the company has



built. Both have power feeds in each direction. Table travel on the No. 22 is 27½ in. with table cross feed of 10¾ in. The knee has a travel of 17½ in. Spindle speeds run to 1,100 r.p.m.; table feeds to 15⅞ in. per min.

Milling Machine, Universal, No. 6

Van Norman Machine Tool Co., Springfield, Mass. (Vol. 79,p.220.)

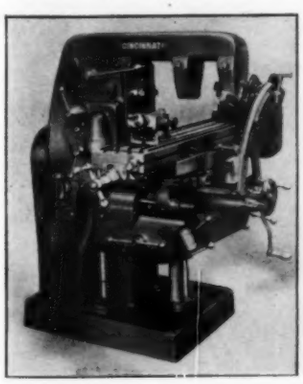
This No. 6 miller differs from the other machines in the line chiefly in its smaller size and in the fact that it is built with hand feeds only. It is de-

signed to handle the wide range of operations occurring in pattern and experimental shops and toolrooms. The cutter head may be swiveled to mill vertically, horizontally, or at any angle. Nine speeds, 80 to 1,450 r.p.m.

Milling Machine, Universal, No. 2 L-Type

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio. (Vol.79,p.835.)

A toolroom miller especially designed for job-shop quantities of the average type of milling machine work, the No. 2 L-

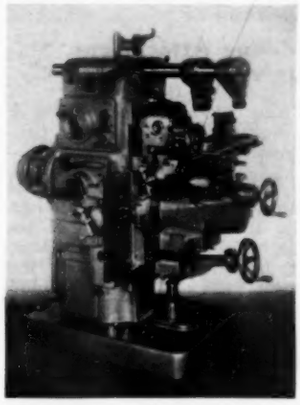


Type universal miller has fifteen spindle speeds from 23 to 1,200 r.p.m. Selection of speeds is by means of two levers located on the left side of the column. Twelve feeds are available, the longitudinal travel ranging from ¾ to 30 in. per min. Feeds may be engaged from the front or rear working position, while the spindle is stationary, running or actually under cut.

Milling Machine, Universal, No. 0 "Omniversal"

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79, p.658.)

The No. 0 "Omniversal" milling machine is designed primarily for toolroom and experimental laboratory use. It is valuable, also, however, for manufacturing departments whose work is on short runs that would not justify fixture expense. Longitudinal feed: table, 17 in., automatic; knee

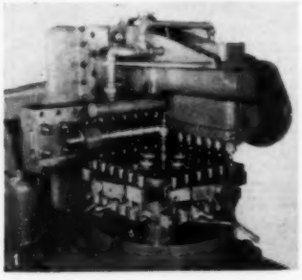


saddle, 17 in., automatic; combined longitudinal feed, table in horizontal position, 34 in., automatic; transverse feed, 6 in., hand; vertical feed, 10¾ in., hand. Centers swing 10 in. in diameter and take 14½ in. in length.

Milling Machine, Cam-Type, No. 42

Producto Machine Co., Bridgeport, Conn. (Vol.79, p.188.)

A No. 42 Producto-Matic milling machine is set up for milling a slot ⅛-in. wide in the end of a piece of cold-rolled steel and chamfering the same end. The machine is equipped with a four-station, work-hold-



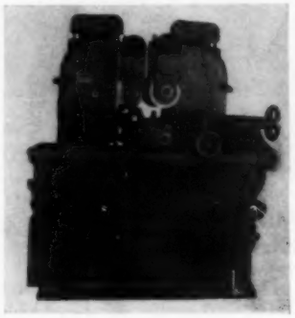
ing fixture, standard cutter spindle bearing, and an auxiliary vertical six-spindle head at right angles to the milling cutters. Each station of the work fixture holds six pieces in line. Production is 1,200 to 1,400 pieces per hour.

Milling Machine, Cam-Type, No. 125

Producto Machine Co., Bridgeport, Conn. (Vol.79, p.309.)

The No. 125 cam-type milling machine was built for milling six locating surfaces on an automobile crankshaft preparatory to center turning on production lathes. The machine is designed to mill 100 crankshafts per hour, one operator at each machine.

Movements consist of bring-

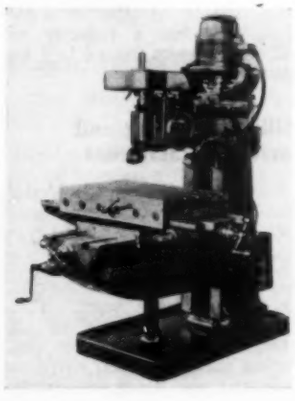


ing the cutter spindles in vertically and moving the table horizontally. These are controlled by drum cams mounted within each of the housings carrying the cutter spindle bearings. The reason for the two movements is to secure a square cut to close limits on each of the six locating surfaces.

Milling and Die-Sinking Machine, 3VS

Reed-Prentice Co., Worcester, Mass. (Vol.79,p.378.)

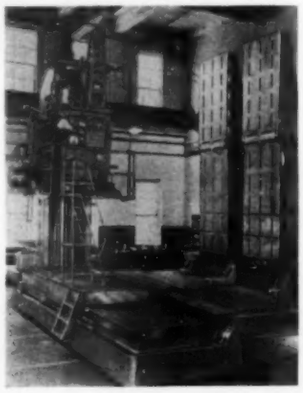
The 3VS vertical milling and die-sinking machine is designed especially for rubber mold and metal pattern work. It is equipped for hand longitudinal and cross feeds. Ends of the table are slotted for clamping extra long plates. Specifications: Longitudinal feed, 27 in.; cross feed, 20 in.; vertical feed of knee, 16 in.



Die-Sinking Machine, Automatic

Keller Division, Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.408.)

As a result of changes in automobile bodies and the subsequent necessity for large dies, the BG-3 machine is designed to cut an impression 12 ft. long by 6 ft. high by 30 in. deep without resetting of the die block. The machine is 32 ft. 5 in. long, 19 ft. 3 in. wide, 21

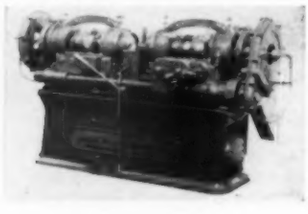


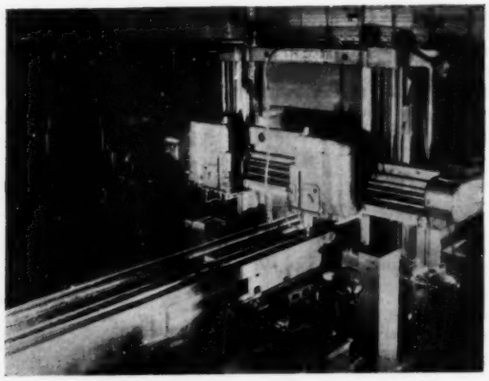
ft. 1 in. high and weighs 154,000 lb. It may be used for two-dimension work, as in profiling, or for three-dimension cutting of solid forms. In either type of operation an electric tracer, mounted on a bracket over the milling cutter, passes over a master form bolted above the work on the fixture-upright, and the cutter duplicates the tracer path precisely. The tracer controls a series of magnetic clutches which actuate the various motions of the machine. Speed changes range from 10 to 800 r.p.m. Horizontal and vertical travel of the head ranges from 1½ to 100 in. per min.

Milling Machine, Planetary, Double-Head

Hall Planetary Co., Philadelphia, Pa. (Vol.79,p.306.)

The two head assemblies of this double-head planetary milling or planetary threading machine are fixed to the bed, but both eccentric bearing assemblies can move toward the center to bring them into the working position. Actuation of the two eccentric bearing assemblies is effected by means of a hand lever that operates bell cranks by means of a toggle. Movement of the spindles is positive because of the toggle action. The position of each spindle can be separately adjusted.





Milling Machine, Planer-Type, All-Electric

Ingersoll Milling Machine Co., Rockford, Ill. (Vol.79, p.630.)

A planer-type milling machine 11½ ft. wide, 10 ft. high, and with a 40-ft. working surface and with completely electrical control, uses both cast iron and welded structural steel units.

An electric pushbutton control system connected to variable-speed d.c. motors relieves the operator of practically all physical effort and enables him to keep the machine working at close to its maximum limits as shown by the meters. No one has ever gone so far before in developing so elaborate a control system, and one which eliminates all clutches except one. That one is used simply for transferring control from the rail to the right-hand vertical head. The contractors and relays are standard rolling-mill control units designed for considerably more severe service than they are likely to encounter in this installation.

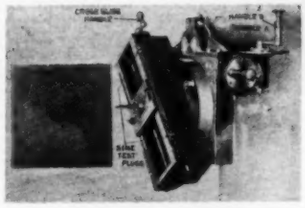
The drive to the table has a 20-in. helical gear on the shaft from the feed box driving a 30-in. worm through teeth cut in its perimeter. This "porcupine" worm engages a segmental rack on the bottom of the 40 ft. table. The arrangement eliminates long leadscrews and shafts.

The various motions of the machine can be controlled either from the panel on the cabinet or from the pendant. Each head is driven by a 2-to-1 variable-speed d.c. motor rated at 20 hp. Each of the four heads can be operated independently.

Jig-Boring Attachment

Production Machinery Sales Co., 4845 St. Aubin Ave., Detroit, Mich. (Vol.79,p.336.)

This attachment is arranged to fasten to the column of the milling machine and overarm. A main gear drives the boring spindle through bevel and spiral gears. Movements of the traveling spindle are two, radially in the slide which in turn has a circular movement imparted by

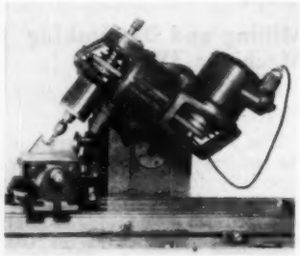


a series of worms and gears, so that any angle to the second can be obtained.

Milling Attachment, High-Speed

Dalrae Tools Co., Syracuse Bldg., Syracuse, N. Y. (Vol. 79,p.441.)

For use on milling machines and horizontal boring mills, this attachment swivels in four directions and mills at any angle. May be equipped with either a ¼- or ½-hp. motor. The ¼-hp. attachment produces speeds of



500 to 4,000 r.p.m. and has a capacity to mill with cutters from $\frac{1}{16}$ to $\frac{5}{16}$ in. diameter in steel; the ½-hp. attachment produces speeds of 350 to 3,000 r.p.m. and has a capacity to mill with cutters from ⅛ to ⅞ in. diameter in steel.

Milling, Drilling and Boring Attachment

Bridgeport Pattern & Model Works, 42 Remer St., Bridgeport, Conn. (Vol.79,p.809.)

Operations can be performed at all angles without changing the set-up of the work. This attachment is adapted to all types of milling machines, including the rectangular overarm style, and was developed chiefly

for die-sinking, jig and fixture, and general toolroom use, but may also be adapted to a variety of manufacturing jobs. Spindle speeds from 275 to 4,250 r.p.m. give the attachment a wide range. Quill travel is 3½ in.

Milling Attachment, Universal

Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, Ohio. (Vol.79,p.442.)

The motor-driven universal milling attachment is built into the machine overarm and replaces the standard overarm. It does not interfere with the normal use of the overarm and arbor support. A 1-hp. motor is connected to the speedbox by means of a flexible coupling. Nine speed changes from 100 to 1,030 r.p.m. are obtained through sliding gears. The flexibility of the attachment may

be increased by the addition of an auxiliary hand-speed quill device.

Table, Tilting, Rotary

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.777.)

This table, used in connection with the P & W No. 1A jig borer, is for precision boring of holes at exact angles as well as for boring work of a circular nature which is most easily laid out using polar coordinates. The scraped surface is 10 in. in diameter and contains standard work-holding T-slots and an accurate hole in the center for locating work. Outer edge of the table is graduated in degrees for approximate indexing. For exact setting a slow motion handwheel is engaged by a clutch knob. The large graduated dial and its vernier make possible accurate indexing to two seconds.

The entire table is hinged at one side and can be tilted to any angle from zero to 90 deg. Graduations and a vernier provide for accurate setting to one minute.

PLANERS AND SHAPERS

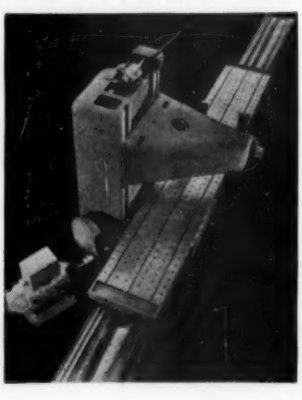
Planer, Openside, Electrified

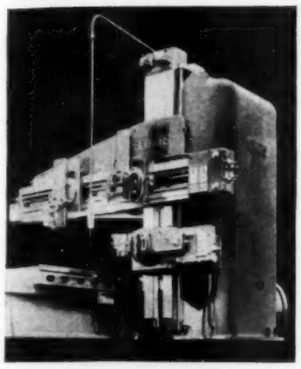
Wm. Sellers & Co., 1600 Hamilton St., Philadelphia, Pa. (Vol.79,p.334.)

An advanced design for openside planers of 60 in. size and larger has individual motor drives and automatic electrical control devices that have made possible considerable advances in simplicity, accessibility, safety, convenience of operation and appearance. Simplicity is gained by the use of individual motors for each head, the platen, rail elevating, clamp and lubricating pump drives. All control is by means of built-in push buttons and switches.

Drive from the motor to the table is by the company's spiral pinion, rack and one pair of helical gears. The driving motor, rated at 100 hp. at 40 ft. per minute and above, has a 10 to 1 speed range and provides cutting speeds of 20 to 200 ft. per min. This wide-speed-range motor is desirable for use of tungsten carbide or high-speed cutting tools.

The rail and side heads are all of the same size and of heavy pattern. All heads are equipped with electrically oper-





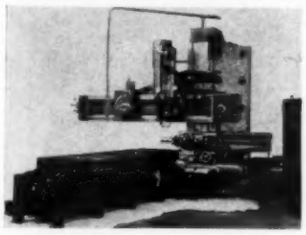
ated tool lifters built into the slides.

One of the novel features of this machine is the simplification of the feed and traverse mechanism by means of electrical apparatus. Each head has its own motor which provides both feed and traverse. The electrical parts include the Westinghouse measuring relay, two magnetic clutches, two elevator car switches for feed and the necessary push buttons for traverse. Stroke limit switches for automatic control of the reciprocation of the platen makes it possible to operate the platen at high speeds.

Planer, Milling

G. A. Gray Co., Cincinnati, Ohio. (Vol.79,p.652.)

Combining the speed of a milling machine with the accuracy and simplicity of tooling of a planer, the milling planer is a tool of great flexibility and general adaptability. Without changing the setting of the job, planing, milling, boring or drilling may be done. When equipped with duplex tables, a job can be set up on one section of the table while machining another job on the other, or both tables can be used at one time for extra long work. This milling planer is built both in the open-



side and double-housing types with any number and combination of milling and planing heads.

Milling heads are individual units, each driven by its own motor. On some kinds of work the heads may carry different size cutters. The milling heads are built in sizes ranging from 7½ to 50 hp. Eighteen single speeds from 10 to 500 r.p.m. are afforded. Rail milling heads may be furnished either swiveling or non-swiveling.

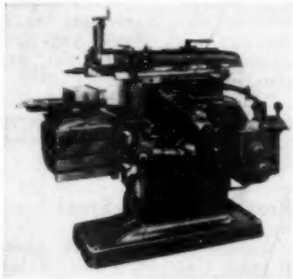
Either planing side heads or milling heads, or combination planing and milling side heads, can be furnished. The milling side heads or combination heads may be either of the quill or bar type. The quill-type side head regularly affords 10 in. axial spindle feed and has 18 changes of speed. The length of axial bar feed is usually 24 or 30 in.

The standard milling feeds for the table, rail heads and side heads are from 1 to 60 in. per min. Standard range of power down feed and up feed of rail heads is ¼ to 15 in., and in-and-out feeds to side heads are from ⅛ to 7½ in.

Shaper, Crank, 12-In.

Hendey Machine Co., Torrington, Conn. (Vol.79,p.188.)

The 12-in. crank shaper is a high-speed cutting tool. On a 6-in. stroke it has a maximum cutting speed of 182 ft. per min., and on a 12-in. stroke a high cutting speed of 120 ft. per min. through the use of light weight alloy material. For forming tool

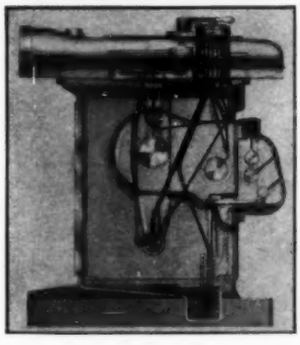


cuts and other work of heavy duty there is also an ample range of slower speeds, the minimum being 23 ft. per min. on 12-in. stroke and 45 ft. per min. on 2-in. stroke.

Shaper, Auto-Oiled

American Tool Works Co., Cincinnati, Ohio. (Vol.79,p.651.)

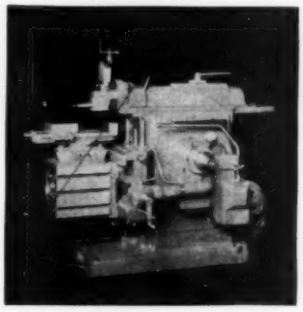
The "Auto-Oiled" 16- and 36-in. shapers will cut 0.60 carbon die-block steel at the rate of 8.2 cu.in. or 2½ lb. per min. They will use full capacity of a 15-hp. motor. There are eight cutting speeds for the ram. All moving parts are constantly flooded with filtered oil in such volume as to carry away bearing heat and foreign matter. A plunger pump forces the oil through an oil filter.



Shaper, Toolroom

Gould & Eberhardt, Newark, N. J. (Vol.79,p.680.)

This 14-in. plain toolroom universal shaper is arranged with a swiveling table having a tilting top. Range of strokes is from 12 to 165 and 15 to 200 per min., depending on the style

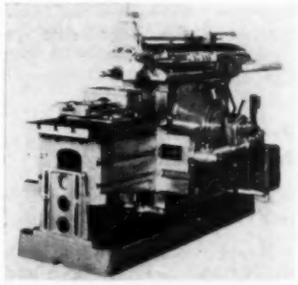


and size of machine. Automatic crossfeed to the table is operated by a cam synchronized with the return stroke of the ram. Sixteen changes of feed from 0.0006 to 0.100 are available.

Shapers, High-Speed

Cincinnati Shaper Co., Cincinnati, Ohio. (Vol.79,p.692.)

A higher speed range up to 200 strokes per min. characterizes the 16-in. high-speed shaper, and an extremely heavy cutting capacity is the outstanding feature of the 24-in. heavy-



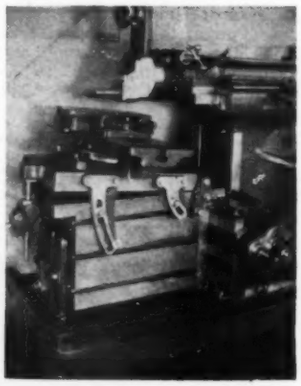
duty machine. Both of these shapers have the built-in power rapid traverse, multiple cam feeds, and automatic oiling. Special high-speed automatic tool heads allow use of tungsten carbide tools.

Shaper, Heavy-Duty

Ohio Machine Tool Co., Kenton, Ohio. (Vol.79,p.638.)

Of attachments designed for special machining operations one is a circular power feed to the head, commonly known as a concave attachment, and a circular table complete with hand and power feed, mounted on the regular table of the machine. The device also has a circular hand feed.

A convex attachment is formed by mounting this same table and feed mechanism on the



Tilting top on table

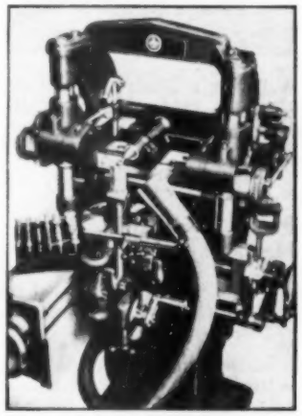
apron after removing the regular table.

A tilting top for the regular table requires no dismantling of the machine. It is mounted on the regular table. Minimum inclination, 20 deg.

Grinding Attachment for Thiel Shaper

Marburg Bros., Inc., 90 West St., New York, N. Y. (Vol.79, p.634.)

A device which allows the grinding of hardened punches and which is used in connection with the Thiel vertical punch

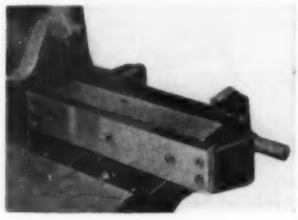


and form shaper enlarges the scope of the work which can be handled. It takes the place of the tool or toolholder regularly used.

Vise Attachment, Shaper

National Machine Tool Co., Racine, Wis. (Vol.79,p.342.)

The "Handy" shaper vise attachment permits changing from end-shaping to ordinary shaping without changing the position of



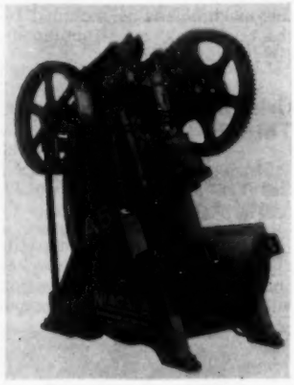
vise, or raising and lowering of the main table. The vise is made in two models having jaw openings of 6 in. for 16 to 20 in. shapers, and 8 in. for 24-in. stroke shapers. A complete shaper vise provides the same facilities as the attachment shown, but consists of two vises at right angles.

PRESSES

Press, No. A-5

Niagara Machine & Tool Works, Buffalo, N. Y. (Vol.79, p.221.)

The No. A-5 is equipped with a six-point engagement pin clutch providing more prompt engagement, more strokes per minute and safer operation. A safety stop prevents repeating.



A "Breech Block" type of die clamp is used. The large diameter backshaft, with its bearings, is mounted in a heavy tubular casing.

Press, Inclinable, No. A-1¾

Niagara Machine & Tool Works, Buffalo, N. Y. (Vol. 79,p.803.)

In the No. A-1¾ press there is used a one-piece, high-tensile, cast-iron frame. This press is equipped with the Niagara fourteen - point engagement sleeve clutch. A positive locking device is built in the throw-out to prevent accidental engagement. The slide is equipped with the Niagara "Breech Block" die clamp.

Press, Inclinable

Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark, N. J. (Vol.79,p.344.)

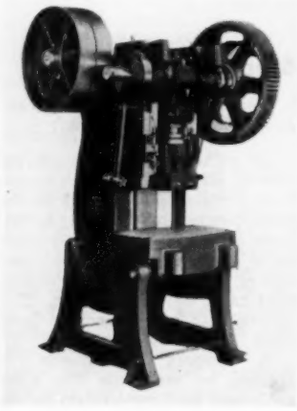
The main features are the slide with round shank hole and one-half round clamping cap. Others are a non-repeat clutch,

web-type self-lubricating full-bearing flywheels, 40 deg. inclination, treadle-operated loop guard and treadle guard.

Press, Inclinable, No. 5-1/2R

Rockford Iron Works, Rockford, Ill. (Vol.79,p.902.)

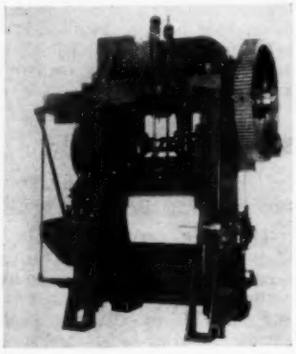
Improvements incorporated in the No. 5½R inclinable open-back punch press include a locking device consisting of a split plug and draw bolt to lock the adjusting screw to the connecting rod. An alloy crankshaft is used. The press capacity is 5 tons.



Presses, Straight-Sided, Automatic-Feed

Henry & Wright Mfg. Co., Hartford, Conn. (Vol.79,p.249.)

Single-geared, straight-sided, welded-steel presses are arranged with an automatic double-row feed and scrap cutters. The jaw clutch has three simultaneous driving points.



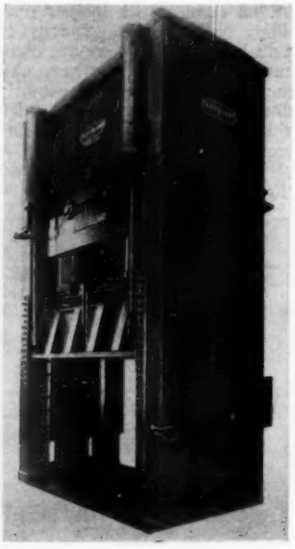
Striking faces are hardened steel inserts. A spring counterbalanced slide, a releasing brake, together with single and continuous operating treadles, are standard equipment.

The press illustrated has a 6-in. stroke and is single geared to operate at 60 strokes per min.

Press, Welded-Steel

Cleveland Punch & Shear Works Co., Cleveland, Ohio. (Vol.79,p.380.)

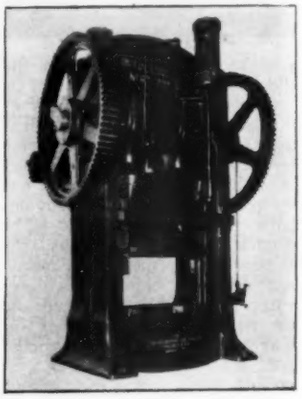
Illustrated is one of the largest size forming presses which is used for body panels. The press weighs approximately 225,000 lb. and is 30 ft. high, having a capacity of 500 tons pressure at the beginning of the draw. It is of the four-point suspension type. Housings are constructed of standard rolled shapes and flat plates electrically welded. The press has a speed of 8 strokes per min. The bed measures 80x124 in., the opening in the bed being 60x118 in. Stroke, 24 in.; maximum die height, 56 in.



Press, Straight-Sided

Toledo Machine & Tool Co., Toledo, Ohio. (Vol.79,p.540.)

Toledo has redesigned its presses to smooth out contours and to eliminate dust pockets. Frame members are alloy castings. The press is equipped with

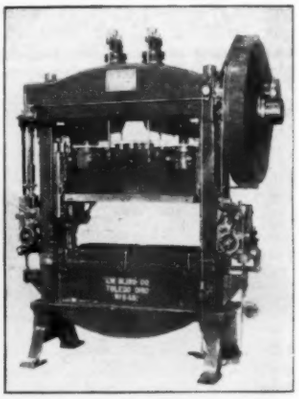


a mechanically controlled, self-adjusting pneumatic friction clutch. The fast action of this clutch permits considerable increase in the production rate.

Press, High-Speed

E. W. Bliss Co., 1420 Hastings St., Toledo, Ohio. (Vol. 79,p.540.)

The press has a width between housings of 48 in., adapting it to the use of follow dies of considerable length. It is regularly rated from 45 to 65 tons. A multiple-speed drive makes



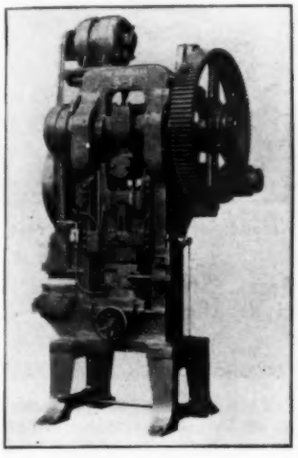
available operating speeds up to 250 or 300 strokes per min. for the non-geared machine, and up to 150 to 175 strokes per min. for the longer-stroke geared machine.

Equipment includes: high-speed double-roll feeds, scrap shear with blade clearance adjustment, spring counterbalance for the slide, automatic force-feed lubrication and a foot-controlled starting mechanism.

Press, Trimming

Cleveland Punch & Shear Works Co., Cleveland, Ohio. (Vol.79,p.635.)

Trimming presses known as 9F are designed for upsetting test pieces. The pieces are first cut to length on the side shear, then set on end under the inner slide and held upright by means

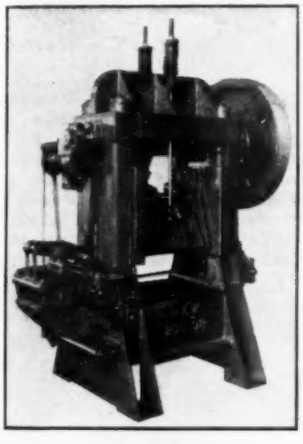


of a magnet block. The entire attachment is boxed in and is equipped with a safety door so that the press cannot be operated until the door is closed.

Press, Automatic

Henry & Wright Mfg. Co., Hartford, Conn. (Vol.79,p.698.)

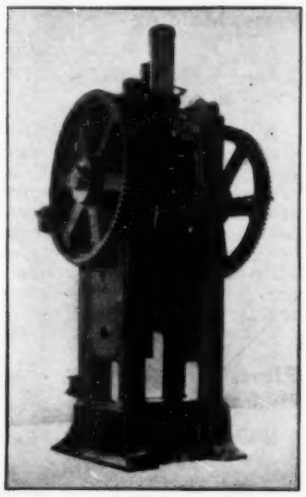
An automatic-feed, high speed press, No. 204½-38, is an addition to the company's line, and is of welded steel construction. The press is equipped with automatic double roll feed of the same type used in the Henry & Wright dieing machine. Its capacity is 80 tons; distance between uprights, 38 in.



Press, Straight-Sided

Toledo Machine & Tool Co., Toledo, Ohio. (Vol.79,p.872.)

Care has been taken to obtain smooth lines. The crown has been heavily reinforced. Diameter of the tie-rods has been



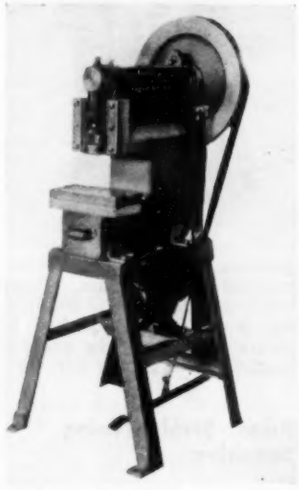
increased. Clutch is of the air type mounted in the flywheel.

This press has a 16-in. stroke with a 6-in. adjustment by power. The slide is 24x35 in., and is counterbalanced by two air cylinders. Bed area is 50x43 in.

Punch, Heavy-Duty, No. 128

Whitney Metal Tool Co., Rockford, Ill. (Vol.79,p.675.)

The flywheel is at the rear of the machine to prevent interference with the work. The machine will be made in a back-geared type for drawing work



with strokes as low as 35 per min. Length of stroke, 1¼ in.; punch hole in ram, 1 in.; depth of throat, 8 in.; die space with stroke down, adjustment up, 4 in.; size of bolster plate, 6x12 in.

Punch, Turret, Deep-Throat, Type R4-P

Wiedemann Machine Co., 1815-31 Sedgley Ave., Philadelphia, Pa. (Vol.79,p.507.)

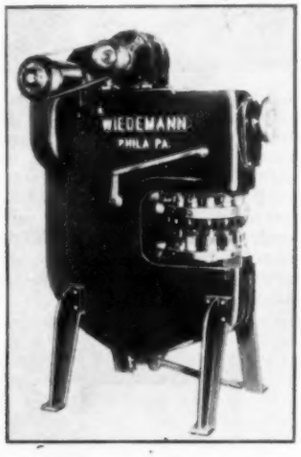
Three standard throat depths, 18, 24 and 28 in.; furnished with

twelve punches and dies up to 1¼-in. diameter mounted in a revolving turret. An indexing device locks the revolving turret when the punch and die are located centrally under the ram. Punches can be easily brought down to a center-punched layout by handwheel. Clearance between dies and strippers, $\frac{7}{16}$ in.; strokes, 100 per min.

Punches, Turret, Type R-5

Wiedemann Machine Co., 1815-31 Sedgley Ave., Philadelphia, Pa. (Vol.79,p.810.)

Type R-5 will punch 1-in. holes in ½-in. mild-steel plate. Punch holders have an auto-



matic take-up for wear. Clearance between dies and strippers, $\frac{3}{8}$ in.; stroke of machine, $\frac{7}{8}$ in.; strokes per minute, 60.

Press, Punch, Turret-Type

Schatz Mfg. Co., Poughkeepsie, N. Y. (Vol.79,p.872.)

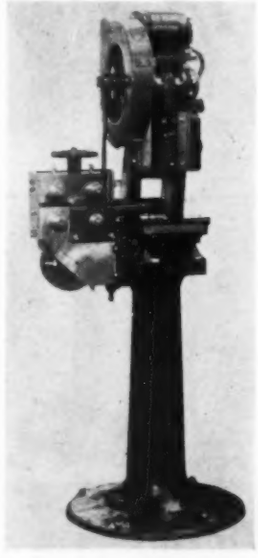
Equipped with a revolving turret containing from six to twelve slides or tool stations, the multi-tool punch press is made in five sizes, with pressure at the ram ranging from 17 to 130 tons, and with a throat depth of 8¾ in. for the smallest size to 14¾ in. for the largest

size. Strokes per minute range from 100 to 75, according to size. The turret is revolved by power. By depressing the left treadle, the desired tool is brought into working position. A feature of this press is the ability to lower the upper tool onto the work.

Press, Automatic, High-Production

E. W. Bliss Co., Toledo, Ohio. (Vol.79,p.929.)

One of the smallest power machines built by the Bliss Company, this automatic high-production press is mounted on a pedestal of convenient height. It is a complete self-contained



unit direct-geared to a ½-hp. motor which drives the flywheel at a speed of 700 r.p.m. The automatic feature is obtained by a special type of roll feed mounted on the left end of the bolster. Variation in the feed, 0 to 1 in.

The feeding mechanism of the rolls is actuated by a bellcrank on the flywheel end of the shaft.

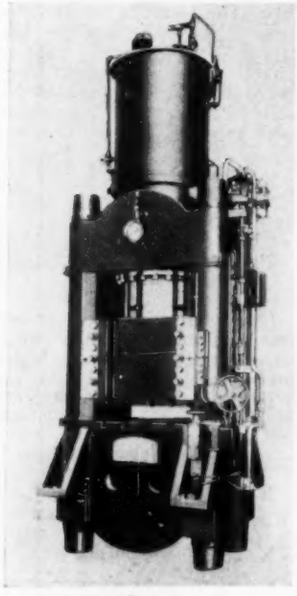
Presses, Hydraulic, Production

Hydraulic Press Mfg. Co., Mt. Gilead, Ohio. (Vol.79, p.670.)

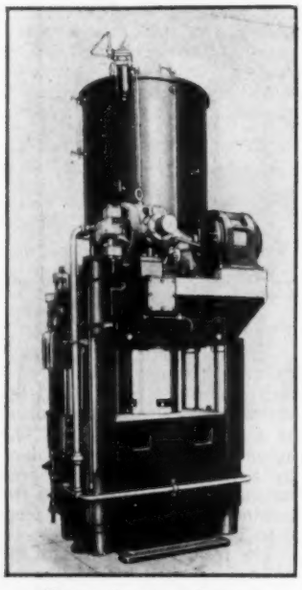
A newly improved line of hydraulic presses, known as the "H-P-M Hydro-Power Fastraverse" has press movements controlled by varying the pump output. The pump is of the high-speed, rotary, radial-plunger type with variable reversal stroke. Automatic or semi-automatic operation can be secured.

Two types of press frames are included in the hydro-power line. The open-rod type and the closed-upright, shrunk rod type. In the open-rod press the uprights serve both as tension members and as guide rods for the moving platen. The closed upright press, on the other hand, has tapered gib guides which are adjustable both front and back to maintain alignment of the ram and platen.

H-P-M presses are available in standard sizes varying in 12 in. increments of bed areas and in pressure capacities from 100 to 5,000 tons.



Closed-upright design

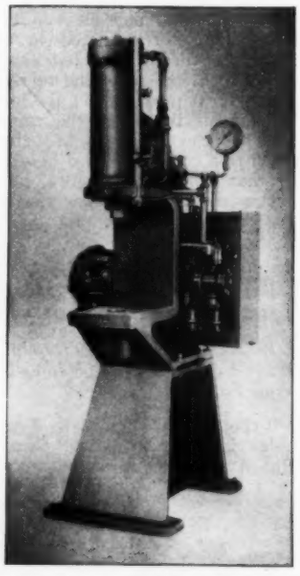


Rear of open-rod press

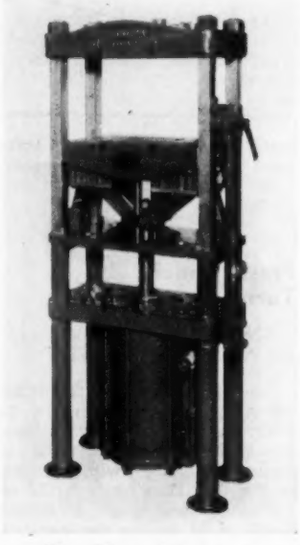
Press, Broaching and Molding

Greenerd Arbor Press Co., Nashua, N. H. (Vol.79,p.901.)

The No. 60 hydraulic arbor press is particularly adaptable for assembly work, push or pull broaching, keyway cutting and



light plastic molding. Pressures obtainable are from ½ to 15 tons on the down stroke and from ½ to 13 tons on the up stroke. Ram travels at the rate of 96 in. per min. under 6 tons pressure, and 36 in. per min. under 15 tons pressure. Height over table is 16 in., and the press receives diameters up to 18 in.



Hannifin molding press

Press, Molding

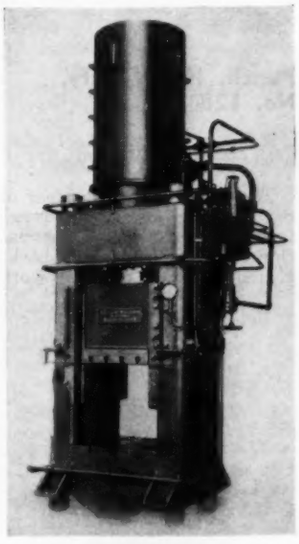
Hannifin Mfg. Co., 621-31 S. Kolmar Ave., Chicago, Ill. (Vol.79,p.570.)

A 15 to 18-ton, air-operated platen press provides an advance stroke at 5½ in. at 5,000-lb. pressure, and a pressing stroke at 1½ in. at 30,000-lb. pressure. Both hot and cold molding, rubber molding and several types of special molding, operations are being performed on this press.

Press, Straightening, Hydraulic

Williams, White & Co., Moline, Ill. (Vol.79,p.475.)

A 750-ton straightening press for large malleable castings is a self-contained press of the rigid-frame type, with tie-rods shrunk in place. An adjustable time delay is furnished to change the length of dwell under high

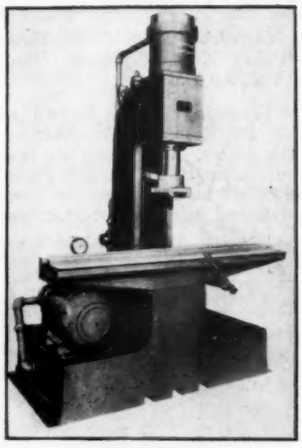


pressure before the automatic reversal of the ram. Rapid traverse of the slide to and from the work is accomplished by kicker cylinders. The press is capable of 12 strokes per min.

Press, Straightening, Sensitive

Hannifin Mfg. Co., 621-31 S. Kolmar Ave., Chicago, Ill. (Vol.79,p.542.)

A 35-ton hydraulic press designed for straightening operations on axle shafts, crankshafts and similar work has been developed. A single lever controls the entire operation of the ram, with a sensitive proportional control action. The ram stroke is 6 in. Speeds are: power stroke, 53 in. per min.; return stroke, 77 in. per min. Dimensions are: table to ram (up) 20 in.; center of ram to face of frame, 9 in.; length of table, 70 in.

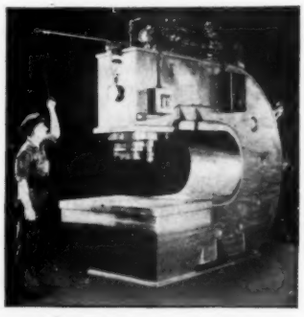


Hannifin straightening press

Press, Straightening, Hydraulic

Denison Engineering Co., Delaware, Ohio. (Vol.79,p.838.)

This press is equipped with a welded steel frame. Motor-driven hydraulic pump, relief

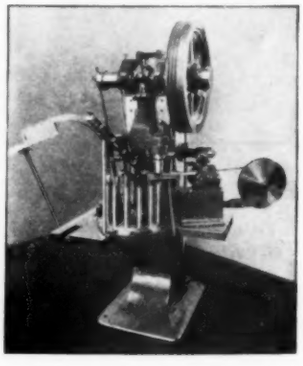


valves, bypasses and other auxiliaries are mounted directly on the top of the frame. Capacity, 100 tons.

Press, Special, Ball-Cap

V. & O. Press Co., Hudson, N. Y. (Vol.79,p.539.)

A machine, designated as the No. 41, for the production of the tube containers with a ball top, is built on the dial principle of assembling machines. It completes the four operations necessary to install the bakelite ball cap in one revolution of the table. The tube is conveyed to

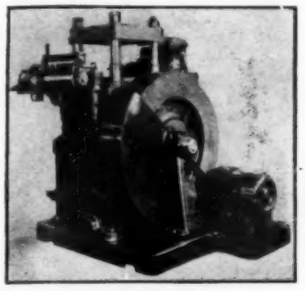


the tools, a gasket is punched and inserted, and the bakelite ball inserted and the tube indented to hold the ball. Production, 50 assemblies per min.

Dieing Machine, 50-Ton

Henry & Wright Mfg. Co., Hartford, Conn. (Vol.79,p.698.)

The precision double roll feed will handle material up to 12 in. in width, with a maximum feed pitch of 8⅝ in. The scrap



cutter automatically cuts material into lengths equal to the feed pitch. An automatic motor-driven, cradle-type stock reel is also in the list of new products.

Press, Notching, No. 410

V. & O. Press Co., Hudson, N. Y. (Vol.79,p.643.)

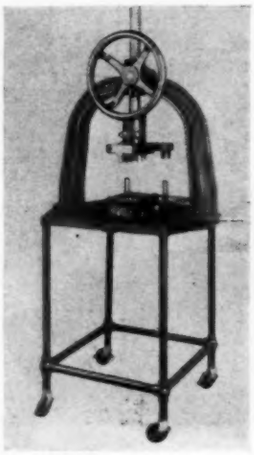
Disk sizes that can be notched range from 3 to 20 in. in diameter, with a maximum of 120 notches. The press will operate at speeds up to 650 strokes per min. and is equipped with a New

Departure variable-speed transmission. Disks are carried on a friction-driven, positive-locking mechanism which is adjustable in and out for various diameters of laminations.

Die-Set Machine, Universal

Lacey Mfg. Co., Bridgeport, Conn. (Vol.79,p.509.)

The housing or yoke carries a rack and pinion which is operated by means of a handwheel. T-slots for clamping the die shoe in position are formed in the ribbed table. A clamping device holds the punch holder shank in the rack. Shearing-in small punches can be done.

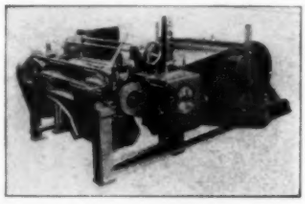


Die-set testing machine

Feeding and Straightening Machine

F. J. Littell Machine Co., 4127 Ravenswood Ave., Chicago, Ill. (Vol.79,p.633.)

Practically all large blanks have previously been cut from sheets cut to length, but by using coiled stock a saving in the cost of blanks can be obtained. This motor-driven feeding and straightening machine is

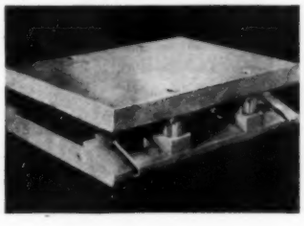


equipped with a reel for feeding wide stock. Any length of feed can be obtained. When the press cuts a blank and the press slide starts up, the feed machine automatically starts and feeds the stock forward the proper length through a five-roll power-driven stock straightener.

Die Sets, Welded-Steel

Danly Machine Specialties, Inc., 2110 South 52nd Ave., Chicago, Ill. (Vol.79,p.309.)

These die sets are produced from steel plate by the torch-cut and welded method. Eight types have been selected and a series of standard sizes developed, covering a wide spread of dimensions. The standard steel die sets include: Round die sets with back posts and in diameters from 6 to 20 in.; round die sets, center post, diameters, 10 to 24 in.; rectangular die



sets, back post, 6x12 in. to 20x35 in.; rectangular die sets, diagonal post, 6x8 in. to 20x35 in.; rectangular die sets, center post, 10x12 in. to 28x28 in.; rectangular die sets, center post, 10x20 in. to 40x100 in.; four-post die sets, 10x12 in. to 28x28 in., and four-post die sets, 10x30 in. to 40x100 in.

Clutch, Power-Press

Niagara Machine & Tool Works, Buffalo, N. Y. (Vol. 79,p.271.)

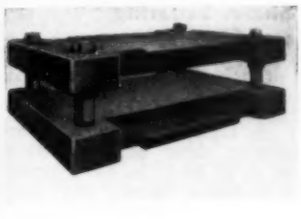
Prolonged life, instant engagement, increased number of strokes per minute and added safety are the features provided by a fourteen-point-engagement, sleeve-type clutch. The shape of the fourteen engaging jaws provides for correct lateral acceleration of the clutch sleeve,

positive, concentric driving grip and provision for absorbing backlash. When the clutch is engaged, the shaft is controlled in both forward and backward directions. The crankshaft may be arranged to stop at, before, or after the top-center position, by mounting the clutch sleeve in the corresponding radial position.

Die Sets, Large

Danly Machine Specialties, Inc., 2110 South 52nd Ave., Chicago, Ill. (Vol.79,p.477.)

The types, sizes and thickness combinations of these large standard die-sets are the results

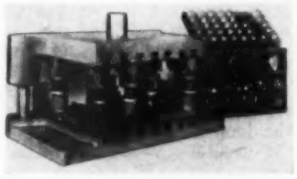


of a survey conducted to determine what can be considered as standard in the large die-set field. Sizes of this line range from 10x18 in. to 46x100 in., available in all-steel or semi-steel.

Dies, Perforating, Adjustable

S. B. Whistler & Sons, Inc., 752-4 Military Rd., Buffalo, N. Y. (Vol.79,p.938.)

The company is offering a 12x12 in. working surface die set with 35 various sizes of punches and dies, gages, 20 stripping units and a case for

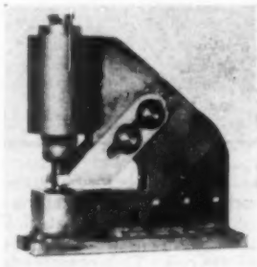


the dies and units not in use, including five punch and die retainers. The center distance can be set as close as 1¼ in. It is possible to punch up to and including ½ in. stock.

Punches, Multi-Unit, "Semco"

Service Machine Co., Elizabeth, N. J. (Vol.79,p.62.)

"Multi-Unit" punches are designed for use in presses or press brakes in place of the usual multiple-punching attach-



ment. They can be clamped on any centers without the necessity for realigning each individual punch and die. Depths of throat provided are 4 and 6 in.

Reel and Roll Feed, Punch-Press

F. J. Littell Machine Co., 4127 Ravenswood Ave., Chicago, Ill. (Vol.79,p.379.)

A No. 0 reel with automatic brake is designed to hold coils of stock weighing up to 100 lb. When fitted with arms, the No. 0 reel will handle coils 9 in. inside diameter, 32 in. outside diameter, 3½ in. wide.

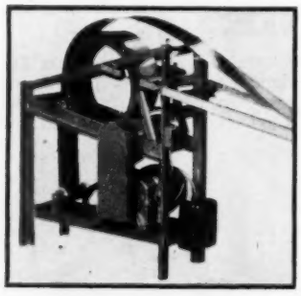
The roll feed handles stock up to 16 in. wide and feeds up to 36 in. per stroke of press,

at a speed of 92 strokes per min. A power-driven reel unwinds a loop of stock, and thus avoids the necessity of the roll feed pulling the stock directly from the coil, as it pulls from the loop only.

Reel, Motor-Driven

Henry & Wright Mfg. Co., Hartford, Conn. (Vol.79,p.698.)

The geared motor drive is controlled by a mercury switch actuated by a balanced arm resting upon the material between the coil and the roll feed of the press. This control stops



the motor before material touches the floor, and starts the motor before the material is pulled tight between the press and the coil. This obviates back pull against the roll feed of the machine.

Reel Stand, Coil-Stock

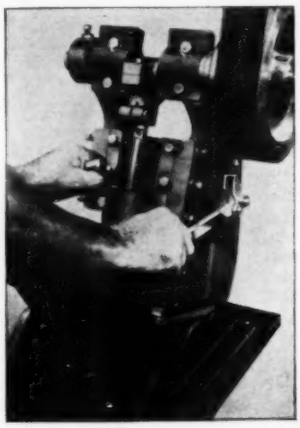
Wittek Co., Chicago, Ill. (Vol.79,p.777.)

This automatic self-centering reel is equipped with four automatically expanding coil holders which slide up or down on the radial arms by means of auxiliary threaded shafts. The shafts are rotated by gears, actuated by rotating the reel to the right or left with the gears in mesh. The four coil holders are always equally distant from the center. Reel will hold coils up to 500 lb. in weight and from 9 to 28 in. open center.

Safety Device, Punch-Press

David J. Ross Co., Benton Harbor, Mich. (Vol.79,p.771.)

The "Rouselle" safety device is adaptable to practically all sizes and makes of hand-operated punch presses. It consists



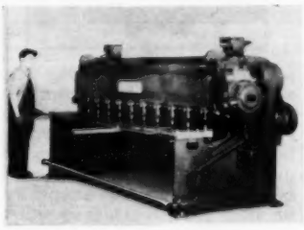
of a bar, a one-piece housing, an operating lever and a spring. A touch on the safety lever with the left hand, when the press is tripped by the right, releases the punch press lever. Both hands must be in use every time the press is tripped.

SHEARING MACHINES

Shear for 10-Gage Material

Cincinnati Shaper Co., Cincinnati, Ohio. (Vol.79,p.279.)

This series of machines, smaller than built heretofore, has a capacity for shearing 10-gage steel in 8, 10 and 12 ft. lengths. Hydraulic hold-downs, with plungers spaced at 12 in. centers, develop a pressure of approximately 2,000 lb. each. The five-jaw clutch is totally

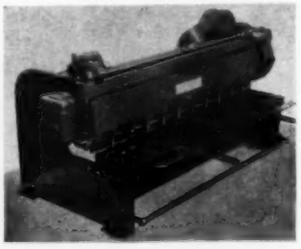


inclosed and runs under oil. In addition, a friction slip or clutch is provided for the flywheel rim as overload protection. The characteristic features of this shear are the low rake of the knives, $\frac{1}{16}$ in. to the foot, the four-edge solid knives, and a speed of 60 strokes a minute.

Shear, Squaring and Slitting

Cincinnati Shaper Co., Cincinnati, Ohio. (Vol.79,p.692.)

A high-speed squaring and slitting shear with a capacity of $\frac{3}{16}$ in. by 96 in. has hydraulic hold-downs, worm and worm



wheel drive, and automatic oiling. To these have been added the tilting of the upper knife bar, graduated stainless steel scales to the table, and automatic gaging front and rear.

Shears, Foot-Operated, Series F

Niagara Machine & Tool Works, Buffalo, N. Y. (Vol. 79,p.933.)

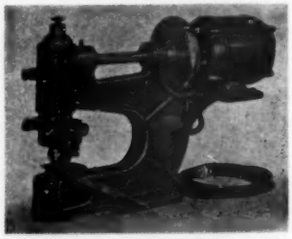
Series F foot-operated squaring shears have a steel hold-down which is operated manually by self-locking eccentrics and exerts heavy pressure on the sheet. On the 96- and the 120-in. shears, a parallel-screw adjustable back gage is furnished. They are available in

cutting lengths from 36 to 72 in. for 16 gage. For 18 gage, 8 ft. and 10 ft. cutting lengths are also made.

Nibbling Machine, No. 109

W. J. Savage Co., Knoxville, Tenn. (Vol.79,p.345.)

The No. 109 nibbler has a capacity of $\frac{1}{8}$ in. in mild steels, and $\frac{1}{16}$ in. in tough alloy steels, and is designed for both templet



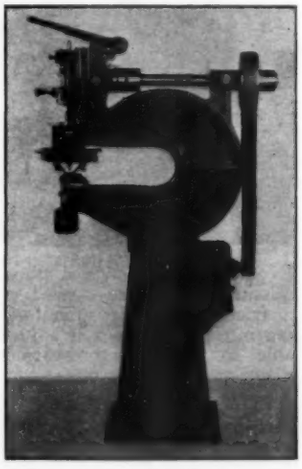
and line cutting. Specifications: throat depth, 9 in.; feed, 36 to 60 in. per min.; net weight, 125 lb.

Adjustable tools and dies, revolving head and adjustable ram bushing are other features.

Nibbling Machine, Turrett-Head

Gray Machine Co., Box 596, Philadelphia, Pa. (Vol.79, p.743.)

The machine is available in two sizes, one an 18-in. throat, $\frac{1}{4}$-in. capacity, the other 24-in. throat, $\frac{3}{16}$-in. capacity. A feature of this machine is the overcoming of lost motion in the



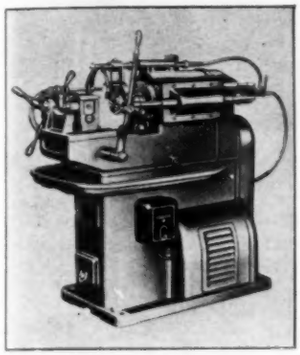
strippers, doing away with chatter and vibration and enabling the operator to follow layouts more easily. This improvement consists of a weighted screw, adjustable so that the weight can be kept just past the center when the screw is tight against the shank of the strippers. The turret head operates in either direction at 180 deg.

THREADING MACHINES

Threading Machine, No. 12

Geometric Tool Co., New Haven, Conn. (Vol.79,p.673.)

While the No. 12 threading machine is a hand-operated machine for general-purpose work, it can be used for rapid production. It may be equipped with or without a leadscrew. The spindle carrying the die-



head advances onto the work which is held stationary. Travel of the spindle is 5 in. Capacity, ¼ to 1 in. straight threads, 8 threads per in. or finer; ⅛ in. to ¾ in. standard pipe threads.

Threading Machine, Model 2

Eastern Machine Screw Corp., New Haven, Conn. (Vol. 79,p.687.)

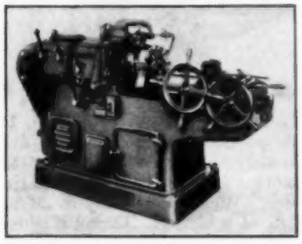
The Model 2 "H&G" threader supplements the standard machine. It is capable of handling larger work and the bed provides much larger chip space.

Various types of tail stocks or slides may be used to accommodate various types of second operation or chucking work. Clearance on the machine is sufficient for the dieheads up to 2 in. capacity.

Threading Machine, Model 35

Acme Machinery Co., Cleveland, Ohio. (Vol.79,p.734.)

Featuring motor drive through V-belt, the Model 35 provides eight speed changes in geometric progression. Various pitches are obtained through pick-off gears. An Acme tangent diehead is furnished as



standard equipment for production work up to 2 in. in diameter. Two hand wheels are furnished on machines equipped with leadscrew attachments. One adjusts for correct diameter, the other for adjustment during roughing.

Bolt Machine, No. 922

Oster-Williams, 2057 E. 61st Pl., Cleveland, Ohio. (Vol.79, p.738.)

Covering all sizes from ⅛ to 2¼ in. at spindle speeds ranging from 32 to 196 r.p.m., the No. 922 bolt machine is built in single- and double-spindle types. The spindle bore of 3¼ in. and

a vise adaptable to many different types of work holders, gives it possibilities for work of special nature. The double-spindle machine is equipped with a mechanical reverse on one spindle, so that both right- and left-hand threads can be cut simultaneously.

Threading Machines, Pipe, Nos. 512 and 521

Oster-Williams, 2057 E. 61st Pl., Cleveland, Ohio. (Vol.79, p.692.)

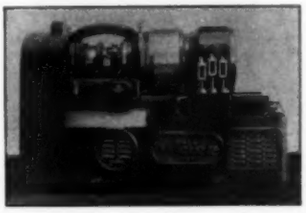
Increased capacity now makes the No. 512 capable of covering all sizes of pipe from ⅛ in. to

2 in., and the machine is built with a rack and pinion feed for the die-head carriage as well as a thread length indicator. The No. 521 machine for bolt threading up to 1⅛ in. has a rack and pinion feed for the carriage.

Threading Machine, Pipe

Hall Planetary Co., Philadelphia, Pa. (Vol.79,p.744.)

This pipe threading machine was designed to mill threads on pipes to a guaranteed accuracy of 0.0005 in. for lead over the whole length of the thread, and to mill the taper within the same



limits in the length of the thread, which is 33/8 in. long, 2 to 18 in. diameter. Cutters are of the patented button type. A 4-ton check is designed not to distort the pipe.

Tapping Machine, Bench

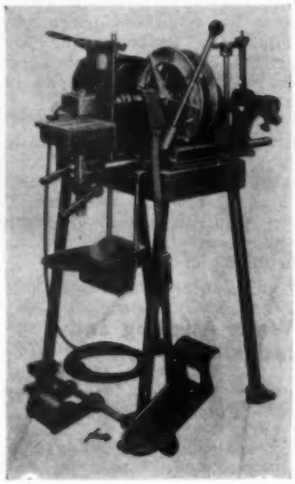
Rickert-Shafer Co., Erie, Pa. (Vol.79,p.310.)

The machine is furnished complete with motor, belt, switch and 6 ft. of cord in capacities of $\frac{3}{16}$ and $\frac{5}{16}$ in. in steel.

Tapping Machine, "Marvel"

Armstrong-Blum Mfg. Co., 357 N. Francisco Ave., Chicago, Ill. (Vol.79,p.478.)

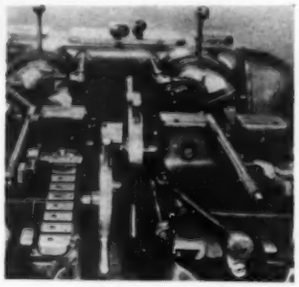
The "Marvel" has a capacity range from fine thread No. 0 to ⅜ in. U.S.S. taps in steel. The sliding table provides micrometer screw adjustment for depth and simplifies holding of fixtures. The machine is made in both bench and floor types.



Timing Attachment, Threading-Machine

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.306.)

For use on the "Landmaco" threading machines, this timing attachment is for threading reduced-body staybolts with a continuous-pitch thread on both ends. It consists of a bracket attached to the carriage end cover and with positions for

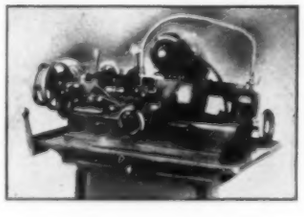


holding the gage bracket for various lengths of staybolts. The gage arm is pivoted in the gage bracket. The timing attachment gage is made in the form of an insert held in the gage arm. This permits making lateral adjustment if desired. It also permits the use of various gages of different thread forms.

Thread Milling Equipment

Waltham Machine Works, Waltham, Mass. (Vol.79,p.633.)

Special equipment for the company's thread milling machine is offered to adapt it for manufacturing purposes. Two



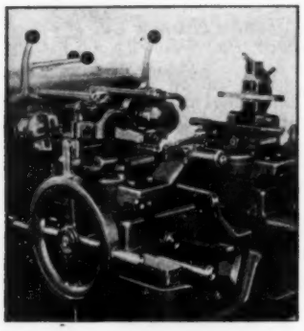
motors eliminate the universal joint and connecting gearing by which the cutter spindle was driven from the constant-speed shaft. A multiple cutter 1 in. wide can be used.

The leadscrew has been removed and a camshaft substituted. This makes the machine more nearly automatic for multiple-cutter work. Another cutter head for use of a single cutter swivels to the required helix angle.

Work Aligning and Indexing Fixture

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.839.)

Designed for threading parts which have a thread on each end, and which require alignment and concentricity of both threads, the fixture for use on Landmaco threading machines



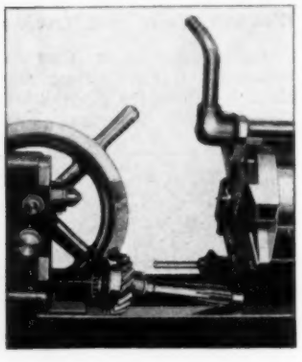
indexes automatically so that both ends can be threaded with one gripping. The application illustrated was used for threading automobile tie-rods, but the set-up may be adapted to other work of a similar nature.

Threading Attachment, Work-Holding

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.743.)

The illustration shows an attachment used on the Landmaco threading machine arranged for holding automobile clutch gears for the threading operation.

On this particular job it was necessary that the thread be concentric with the gear. The arrangement included a live center supported in the diehead. The gear is clamped for the threading operation, placed by hand over the mandrel and driven by lugs on the mandrel engaging with the internal gear.



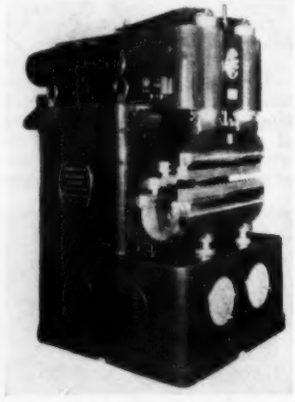
Extending slightly beyond the face of the diehead, the live center is placed under spring pressure so that as the operator moves the carriage forward in order to bring the gear to be threaded adjacent to the chasers, the center moves back into the bore of the head.

WELDING MACHINES AND EQUIPMENT

Welding Machine, Projection

American Electric Fusion Corp., 2610 Diversey Ave., Chicago, Ill. (Vol.79,p.280.)

The machine weighs in excess of 14,000 lb., has a base 52x52 in., and is 88 in. high. It is capable of welding simul-

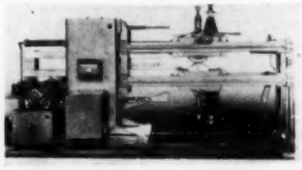


taneously 20 spots distributed over a space of 36 in. in length. Output of the machine is 1,200 complete welds per min.

Welding Machine, Seam

Thomson-Gibb Electric Welding Co., Lynn, Mass. (Vol.79, p.222.)

This resistance welder simplifies the welding together of extremely wide sheets of metal. This welder employs two travel-

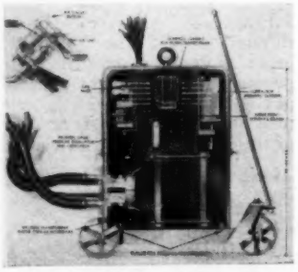


ing welding rolls. The entire unit consisting of the transformer secondary and welding wheel travels the length of the seam propelled by hydraulic means.

Welding Machine, Spot, Portable

Thomson-Gibb Electric Welding Co., Lynn, Mass. (Vol.79, p.252.)

A mobile welding machine consists of a welding gun, which is operated by pushbutton switch, and a portable steel cabinet which contains all the transforming, regulating, con-

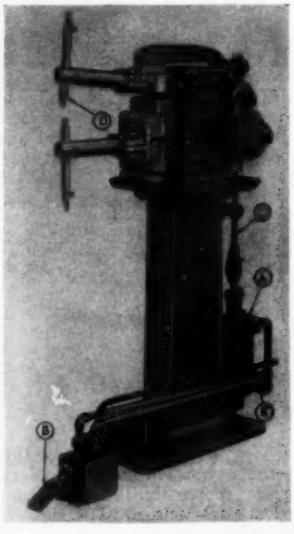


tacting and timing apparatus. It is particularly adapted to assembly line production or to work which is fabricated in jigs. Welds take only 1/20 to 1/3 of a second. The unit illustrated can weld clean metal up to 16 gage, and the gun can be fitted with yokes having throat depths up to 12 in.

Welding Machine, Spot

Eisler Engineering Co., 740 S. 13th St., Newark, N. J. (Vol.79,p.337.)

Air pressure is utilized for closing the electrodes upon the work in this welder. Available

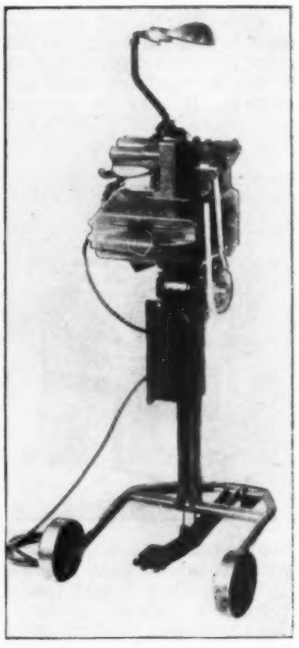


in sizes from 5 to 75-kva. and capable of welding metals up to 0.750 in. in thickness.

Welding Machine, Cable-End

Eisler Engrg. Co., 740 S. 13th St., Newark, N. J. (Vol.79, p.741.)

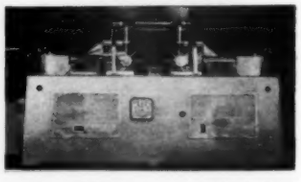
Flexible cable may be cut apart or two pieces joined and trimmed without unraveling on this combination cutting, welding and trimming machine. It is equipped with a special annealing device. Application of current welds the strands together and finally severs the cable. The strands will not then unravel.



Welding Machine, Stud

Thomson-Gibb Electric Welding Co., Lynn, Mass. (Vol.79, p.254.)

This resistance welding machine provides a way to manufacture on a mass production scale, parts that now require slow and expensive casting. For example, the machine welds studs to the circumference of pipe. Operation is entirely auto-



matic. Studs are loaded into the hoppers at the top of the machine from which they pass down into the magazine below and feed into position for multiple-indexing electrodes. Each pair of studs is attached at the same time by a series weld.

Alignment and spacing are controlled by the indexing fixtures and the entire operation is performed at high speed.

Cutting Machine, Flame, Pipe

Oster-Williams, 2057 E. 61st Place, Cleveland, Ohio. (Vol. 79,p.744.)

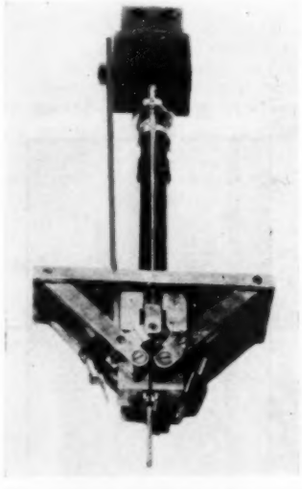
This cutting machine duplicates in design any pattern which is required in any kind of pipe welding job without using cams, templets or special

fixtures. The cutting torch is guided by the mechanism which duplicates the motion of a torch held in the operator's hand. It will cut any size of pipe from 2½ to 12 in., making full size fittings of various kinds.

Feeding Device, and Electrode

Welding Wire Co., 28 Harvard St., New Britain, Conn. (Vol.79,p.250.)

The use of "Woven Welding Wire" and electrode contactor apparatus allows full automatic metallic arc welding. Woven Welding Wire consists of a solid core having multiple strands of wire woven thereon in the nature of a mesh, the pockets of which are filled with flux. The

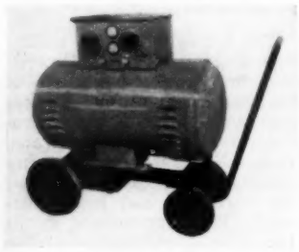


electrode contactor apparatus consists of a toggle-type, free passage contactor and separates the mechanical control from the contactor, to have the control non-conductive from a current and heat standpoint. The take-off reel has a ground that makes use of the electrode coil as a high resistance to balance the variable resistance of arc.

Welder, Improved

Ideal Electric & Mfg. Co., Mansfield, Ohio. (Vol.79,p.187.)

The Noel "Speed Arc" welder features unity power-factor motor drive, 10 to 15 per cent better over-all efficiency, and an

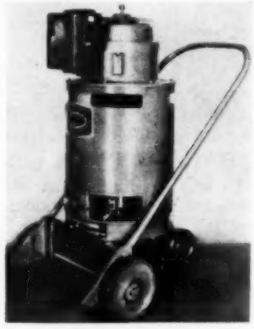


extremely fast arc. Noel welders provide both 25- and 40-volt operation, are also available for d.c. motor drive and engine drive.

Welder, Arc, 50-Amp.

Harnsischfeger Corp., Milwaukee, Wis. (Vol.79,p.307.)

The stable high-speed arc enables this welder, known as the W50-254, to weld down to 26 gage steels. No external reac-



tors, resistors, or separate stabilizers are required. Being a motor-generator unit with a 3-hp. squirrel-cage motor, the welder operates on any a.c. power line.

Welder, Arc, 75-Amp.

Hobart Bros., Troy, Ohio. (Vol.79,p.345.)

Rated at 75 amp., 25 volts, being designed especially for

light gage welding, this welder has a range of 15 to 125 amp. in three steps. It performs well on 24 gage and heavier, using 1/16 in., 5/32 in., or 1/8 in. electrodes, either bare or coated.

Welder, 100-Amp.

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.409.)

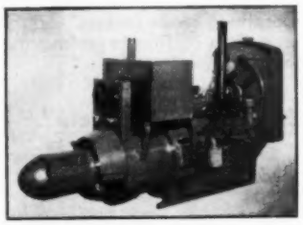
A small motor-generator type of arc-welder, known as the SA-100, this unit delivers as low as 30 amp. at the arc without the use of auxiliary devices. The generator is of the single-oper-

ator, variable-voltage type with 100 amp. rating. Dual control provides independent adjustment of open-circuit voltage and welding current.

Welder, Engine-Driven, 200-Amp.

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.905.)

Known as the 200 Amp. "Shield Arc Special," this engine-driven welder supplies a uniform current for welding with bare or heavily coated shielded-arc type electrodes in



all sizes up to ¼ in. The welding current range of this machine is from 60 to 250 amp. Generator is the single-operator, variable-voltage type. The welder is powered by a Waukesha 4-cylinder engine.

Welder, Heavy-Duty

Harnischfeger Corp., Milwaukee, Wis. (Vol.79,p.933.)

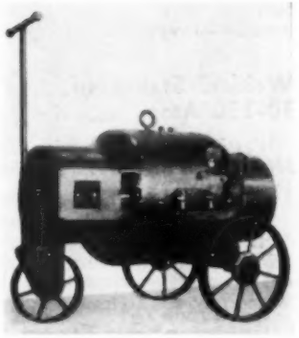
The 200-, 300- and 400-amp. "P&H-Hansen" heavy-duty arc welders are of improved design. The machines now have oversize two-bearing armature shaft, removable bearing cartridges,

single current control, dust-proof calibration plate, heavy-duty and built-in polarity switch.

Welders, D.C., "Flexarc"

Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa. (Vol. 79,p.938.)

An improved line of "Flexarc" d.c. welders is equipped with a single-dial preset control by which the welding current can be set to the exact number



of amperes. Output is adjusted by means of iron damper plates operated by a single-point "Adjustomatic" control. The driving motor is of the squirrel-cage induction type.

Welders, Arc

Miller Electric Mfg. Co., Inc., Appleton, Wis. (Vol.79,p.807.)

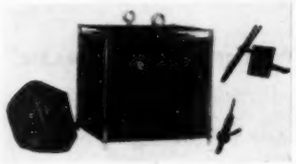
Designed for welding down to 27 gage steels with current from 15 to 275 amp., the arc welders are made in three sizes: 15 to 150 amp., which handles 1/16 to 5/32 in. rod; 15 to 275 amp., which handles 1/16 to ¼-in.

rod, and the "Junior Welder," 15 to 90 amp., for small power service.

Welder and Torch, Roffy

Electric Torch Mfg. Co., 5321 Horton St., Oakland, Calif. (Vol.79,p.445.)

Two sizes of arc torch and welder, known as the No. 3 and No. 4, have been added. Six graduated steps of heat control, a self-adjusting voltage regulator and automatic

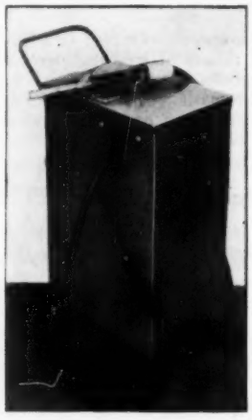


starter for the arc are provided. Light gage materials, 26 to 28 gage, may be handled by the No. 3 machine. The No. 4 machine encompasses the heaviest work encountered in commercial welding.

Welder, Stabilized, 30-150 Amp.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Vol.79,p.903.)

Recommended for both production work and for use in repair shops, the 30-150-amp. a.c. welder is of the reactance stabilized type. Three major



steps of current adjustment are obtained from taps on the reactor. Five steps of fine adjustment are obtained from intermediate taps between each major step.

Cable, Welding, "Realwear"

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.840.)

Designed to meet conditions of extremely severe wear and abrasion, the "Realwear" welding cable consists of stranded, fine, tinned copper wire. The cover is provided with a finish resistant to oil, grease and acid.

Cable Connector, Welding

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.932.)

A quick-detachable connector designed for use in connecting welding or electrode cable locks

in position and cannot work loose or be accidentally pulled apart.

Cycle Recorder

General Electric Co., Schenectady, N. Y. (Vol.79,p.740.)

This cycle recorder is designed for calibrating or adjusting resistance welder timers, or for producing a permanent record of a weld time. The device records on a strip of paper the

cycles of duration of current flow. It is oscillographic in nature. The recording device is inkless. A stylus carried by the vibrating reed presses lightly on a strip of thin paper moving over a graphite roll.

Electrode, "Toolweld"

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.217.)

"Toolweld" is designed for restoring worn edges on tools. It provides a deposit which is equivalent to high-speed tool steel and will retain a hardness of 55 to 65 Rockwell Cup to approximately 1,000 F. Toolweld electrode is made in 14 in. lengths in four sizes, 3/32, $\frac{1}{8}$, 5/32 and $\frac{3}{16}$ in.

Electrode, "Abrasoweld"

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.248.)

A hard surfacing electrode for building up carbon steel, low alloy or high manganese steel surfaces to resist abrasion is known as "Abrosoweld." It provides a deposit of the self-hardening type.

Welding Rod, Stainless-Steel

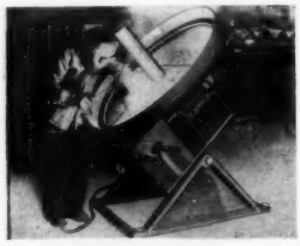
Linde Air Products Co., 30 E. 42nd St., New York, N. Y. (Vol.79,p.807.)

The Oxweld No. 28 columbium-treated 18-8 welding rod simplifies the fabrication of products from 18-8 stainless steel and improves the corrosion resistance of the fabricated joint. No heat-treatment after welding is necessary, because full corrosion and heat-resistant qualities are secured in the "as-welded" condition.

Fixture, Turntable

Harnischfeger Corp., Milwaukee, Wis. (Vol.70,p.444.)

A welding fixture with an inclined turntable for easier handling of circular pieces enables the operator to weld continuously in a downward position.



Speed can be regulated from 3 to 18 in. per min. The turntable can be tilted. Known as the "RT," this fixture is offered in various sizes to handle loads up to 4 tons.

Fixture, Welding

United Engineering & Foundry Co., Pittsburgh, Pa. (Vol. 79,p.874.)

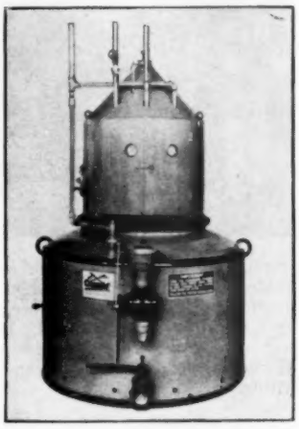
This welding manipulator permits positioning work so that fillet welds of correct radius can be made without waste of electrode metal, and allows savings of 25 to 40 per cent in welding time. It also frees the overhead crane for other duties. The welding manipulator consists of a faceplate operated by power. The faceplate can be

tilted or rotated to any desired position. The capacity of this device is from 5 to 7 tons.

Generator, Acetylene

Linde Air Products Co., 30 East 42nd St., New York, N. Y. (Vol.79,p.603.)

Three sizes of an acetylene generator of the medium pressure type for stationary service are designated as Oxweld Type



MP-5, have carbide capacities of 150-, 300-, and 500-lb. respectively, with acetylene generating capacities ranging from 300- to 1,000-cu.ft. per hr.

The diaphragm is sensitive to slight changes in pressure and the carbide is released evenly in just the amount needed to maintain a constant pressure.

Generator, Acetylene

Linde Air Products Co., 30 East 42nd St., New York, N. Y. (Vol.79,p.870.)

Developed for portable or stationary use with any type of oxy-acetylene cutting or welding apparatus, this medium-pressure generator is known as

the "Oxweld" Type MP-6, has a 50-lb. carbide capacity with a double rating of 100 cu.ft. of acetylene per hour. Any desired pressure up to 14 lb. per sq.in. may be obtained.

Holder and Clamps, Electrode

Metalweld, Inc., 26th & Hunting Park Ave., Philadelphia, Pa. (Vol.79,p.605.)

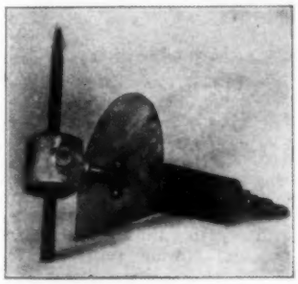
"Navy-Type" electrode holder and "Shur-Grip" clamps eliminate poor contacts along the path from the generator to

the electrode, preventing the most frequent cause of porous welds. The electrode is held in a vise-like grip, yet a slight twist with a fresh rod releases the used one.

Holder, Electrode

Colmonoy, Inc., P. O. Box 977, Los Nietos, Calif. (Vol. 79,p.842.)

Designed for general carbon-arc welding and cutting, the electrode holder is furnished with adapters to fit ⅝-in., ½-in.,



or ¾-in. diameter carbon. It has a hollow fiber handle, a copper shield and a water-cooled aluminum head.

Hood, Welding

E. D. Bullard Co., 275 Eighth St., San Francisco, Calif. (Vol. 79,p.540.)

The "Slide Front" style has the smoked horsehide hood suspended from a light weight head frame. The frame holds the hood from 3 to 4 in. away from

the head. The "Tilt Front" style is for work in close quarters, having no frame so that the hood rests snugly on the head.

Manifold for Acetylene Cylinders

Linde Air Products Co., 30 East 42nd St., New York, N. Y. (Vol.79,p.809.)

Available in a ten-cylinder unit, to which extensions in units of five or ten cylinders can be made, the wall-type acetylene cylinder manifold,

Oxweld Type M-8, consists of two high-pressure header units. These feed into a central regulation system which delivers acetylene to the distribution piping system at pressures up to 15 lb. per sq.in.

Regulator, Heavy-Duty, Style 8490

Air Reduction Co., 30 East 42nd St., New York, N. Y. (Vol.79,p.934.)

The Airco-DB Style 8490, two-stage reduction regulator is indicated whenever the oxygen demand per regulator is in ex-

cess of 1,000 to 1,200 cu.ft. per hr. Maximum operating pressure is 200 lb. per sq.in.

Torch, Welding

Linde Air Products Co., 30 East 42nd St., New York, N. Y. (Vol.79,p.572.)

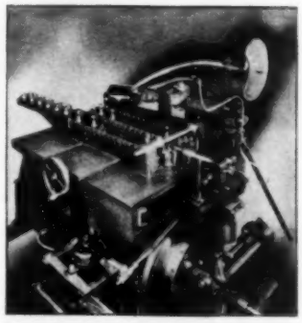
The Purox No. 35 general-duty welding torch is adaptable to the lightest as well as to the heaviest work found in most welding shops. Nine tips perform the duty of fifteen, the number usually required.

OTHER MACHINES

Bending Machine, Tube

Frank Automatic Bending Co., Second & Elm Sts., Cincinnati, Ohio. (Vol.79,p.542.)

Copper, brass and aluminum tubing from ⅛ to ½ in. can be bent in a horizontal or vertical plane in one continuous operation. Rectangular wire can also be coiled edgewise. Weight



of the machine is 3,000 lb. The tubing is fed into a straightening unit, gripped by a continuous conveyor, and pushed through a bending unit which is automatically oscillated.

Bandsaw, Open-End

Grob Bros., West Allis, Wis. (Vol.79,p.412.)

On the "Open-End" bandsaw for internal sawing, a 150-ft. saw band is wound helically over a drum and looped over three guide sheaves, arranged for forward motion at cutting speeds, and reverse motion at high speed. Three minutes of sawing can be done at the lowest cutting speed before the end of the band saw has been

reached, at which time the machine will automatically stop. Only 18 seconds are required for the return of the band to its original position. Four cutting speeds: 50, 75, 100 and 150 ft. per min. The sawing table, 24x28 in., tilts in two directions. The throat of the machine is 25½ in., and material up to 9 in. in height can be sawed.

Bandsaw, Precision, Thiel

Marburg Bros., Inc., 90 West St., New York, N. Y. (Vol.79, p.601.)

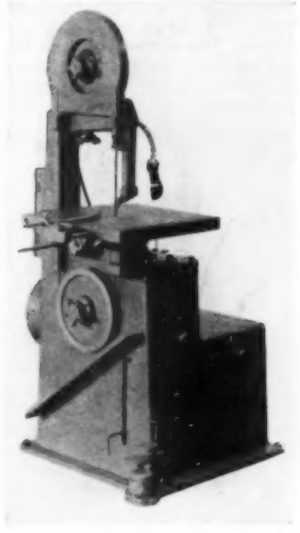
The smaller size will handle material up to 8-in. thickness, has a table 20x20 in. and weighs 860 lb. Material up to 10 in. in thickness may be sawed on the larger machine which has a table 30x26 in. and weighs approximately 1,700 lb. The two machines are provided with four and eight speeds, respec-

tively. Tables on the smaller machines may be tilted in four directions. The column of the larger type machine may be tilted with the table remaining in a horizontal position.

Bandsaw with Filing Attachment

Neff, Kohlbusch & Bissell, 2400 W. Madison St., Chicago, Ill. (Vol.79,p.935.)

A continuous filing attachment for use in manufacturing dies is applied to the precision bandsaw. An arrangement for automatic feed of the work is incorporated. When band filing is to be done, the upper and



lower saw drums are replaced to accommodate the file chains. Distance saw to column, 14 in.; size of table, 22x22 in.; tilt of table in four directions, 10 deg.; maximum thickness of material admitted, 8 in.

Sawing and Filing Machine, Continuous

Continental Machine Specialties, Inc., 1301 Washington Ave., S., Minneapolis, Minn. (Vol.79,p.873.)

A dual-purpose machine, the "Do-All" band filing and bandsawing machine can be changed from one function to the other in less than 3 min. The file

band is not a flexible file, but is made up of 3-in. segments. Two sizes: capacities of 6¼ and 7½ in.

Filing Machine, Die

Illinois Tool Works, 2501 N. Keeler Ave., Chicago, Ill. (Vol. 79,p.710.)

This die filing machine has height to the top of the table of 12½ in., height to the top of the overarm, 25 in. Two speeds, 600 and 450 strokes per min. Stroke is 1½ in.

The 12-in. table tilts to an angle of 20 deg. in two directions, and the hole in it has a removable bushing to make room for large files, saws, or stones. The space from the center of the table to the overarm is 6¼ in., and the overarm is removable.

Filing and Sawing Machine

Foley Mfg. Co., Inc., 11-15 Main St., N. E., Minneapolis, Minn. (Vol.79,p.28.)

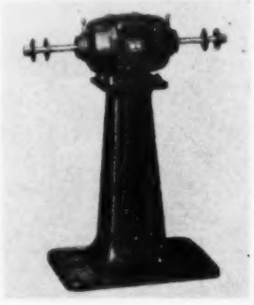
The die-making machine can be used on a large variety of work besides the usual die sawing and filing. Known as

Model DM-1, this machine will take any type or size of saw or file. The machine will saw to the center of a 13-in. piece and will saw and file steel 3 in. thick.

Buffers, Bench and Pedestal

Baldor Electric Co., 4357 Duncan Ave., St. Louis, Mo. (Vol.79,p.345.)

A line of ball-bearing buffers has been announced in both bench and pedestal types, in sizes ranging from ⅓ to 5 hp.



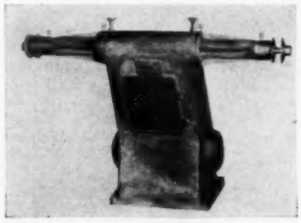
Features are: large ball bearings, extended end bells, long distance between wheel centers, heavy shaft, minimized vibration and totally inclosed motor.

Models are available for two or three-phase, 220 or 440 volts and single phase, 110 or 220 volts, not interchangeable.

Polisher and Buffer, Wide-Swing

Standard Electrical Tool Co., 1928 W. 8th St., Cincinnati, Ohio. (Vol.79,p.600.)

The "Proper Speed" buffing and polishing machine can be furnished in 10- or 15-hp. sizes, as a supplement to the company's line of "Variable Speed"

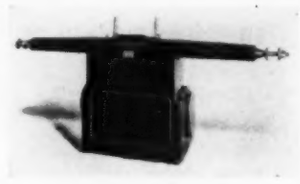


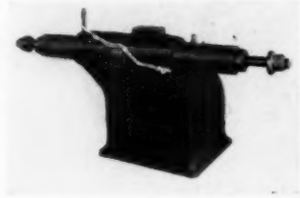
buffing and polishing machines of smaller sizes. Over-all length of the spindle is 108 in., and the 29 in. distance between the base and the inside of the wheel provides ample room for finishing of unusually large parts.

Lathes, Fender Polishing

Hammond Machinery Builders, Inc., Kalamazoo, Mich. (Vol.79,p.937.)

Two polishing lathes especially designed for automobile fender polishing and other work of a similar nature requiring wide swing machines: Model RR, two-spindle, two-motor polishing lathe made in three



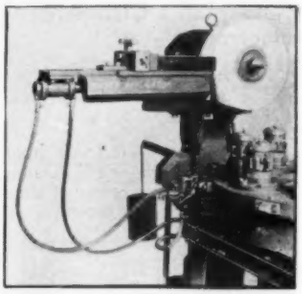


sizes for 3 to 15 hp. motors; distance from the side of the base to the inside of the wheel may be up to 30 in.; Model ROEH overhanding - spindle lathe; motors of 10, 15 or 20 hp.

Applicator, Buffing-Composition

Packer Machine Co., Meriden, Conn. (Vol.79,p.573.)

An automatic applicator for feeding composition to the buffing wheels of polishing and buffing machines takes composition in cake form, 6 in. wide, 1½ in. thick and 11 in. long.

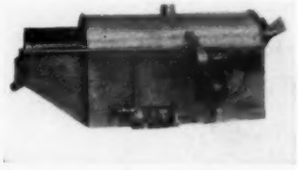


Compressed air, at a maximum of 60 lb. pressure, provides the operating force. Cam operation is governed by the travel of the work table.

Cleaning Machine, Continuous

N. Ransohoff, Inc., Cincinnati, Ohio. (Vol.79,p.28.)

A continuous washer for metal parts that subjects the work to a soaking and spray wash and transfers it from one

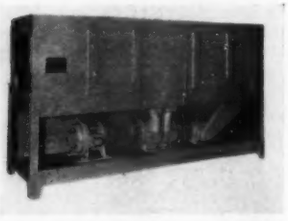


drum to another without dropping it is announced. Driving motor and pump are attached to the side.

Cleaning Machine, "Autosan," Model MR-8

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. (Vol.79, p.657.)

Parts are placed on a wire-mesh conveyor and automatically carried through the washing and rinsing sprays. This model is equipped with two out-

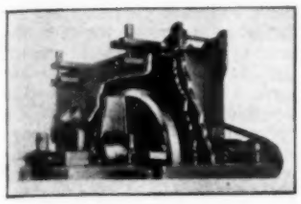


side or extended tanks having perforated scrap trays which are easily removed for emptying. The MR-8 may be furnished with several types of conveyors.

Cleaning Machine, Abrasive-Type

Pangborn Corp., Hagerstown, Md. (Vol.79,p.905.)

The Rotoblast employs a rapidly spinning wheel to propel the abrasive by controlled centrifugal force; cleans gray iron, steel, alloy and malleable cast-

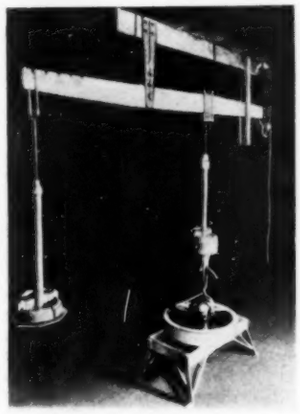


ings, forgings, steel products including pipes, billets, bars, strips, blooms, shapes and heat-treated parts. It is also recommended for preparing properly cleaned surfaces for metallizing, sherardizing, galvanizing, and all types of plating.

Crowning Apparatus, Carter

Northill Co., Inc., 5728 Santa Monica Blvd., Los Angeles, Cal. (Vol.79,p.873.)

Any desired crown or shape is produced by oscillating the roller across the work, which is supported on the forming table. Three table forms are provided,

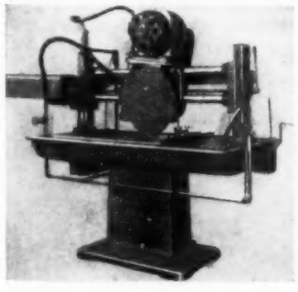


a spherically concave bowl, a flat plate, and a reverse curve. The Carter Crowner is also used for finishing or planishing drop hammer and rubber die roughings.

Cutting-Off Machine, Abrasive

Andrew C. Campbell Division of American Chain Co., Inc., Bridgeport, Conn. (Vol.79,p. 189.)

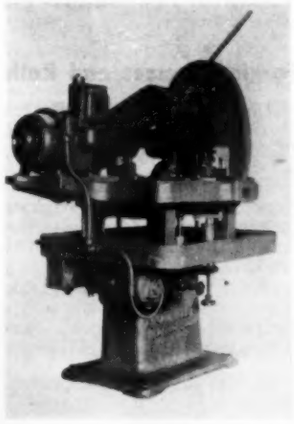
The Model 302 was designed primarily for making long cuts through flat or slab stock, but bar stock can also be cut. Hydraulic feed mechanism permits the abrasive cutting of larger sizes of flat material than has heretofore been considered practical.



Cutting-Off Machine, Abrasive

Andrew C. Campbell Division of American Chain Co., Bridgeport, Conn. (Vol.79,p.30.)

An abrasive cutting-off machine has coolant supplied to the disk. Materials to 3 in. in diameter or tubing up to 3½ in. in

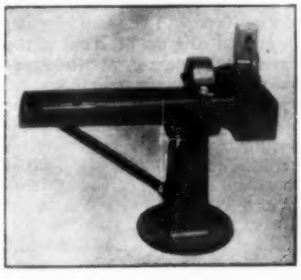


diameter can be cut off. Model No. 202 has the work clamp operated by a treadle, whereas Model No. 203 has an automatic electrically operated clamp.

Cutting-Off Machine Abrasive

Eisler Engineering Co., 769 S. 13th St., Newark, N. J. (Vol.79,p.904.)

Designed for cutting through various shaped bars, rods or tubes of metals, hard glass or ceramics, the wet abrasive cut-



off machine will take pieces up to 2½ in. diameter. A quick-acting clamp and a long trough facilitate holding and handling the material.

Bar Stands, Cut-Off

Andrew C. Campbell Division of American Chain Co., Bridgeport, Conn. (Vol.79,p.636.)

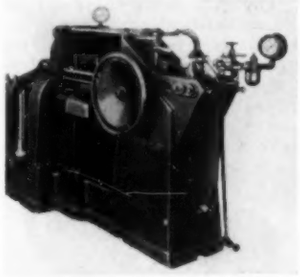
Campbell bar type floor stands are for use with Models 202 and 203 wet abrasive cut-

off machines and Model 20 dry abrasive cutoff machine. Any shape or size of stock which the machine will handle is supported at the correct height, which is adjustable.

Die-Casting Machine, Model No. 6

Madison-Kipp Corp., Madison, Wis. (Vol.79,p.665.)

Model No. 6 is intermediate between the Kippcasters and the automatic machines built by the corporation. It will handle all of the standard die-casting alloys in zinc, aluminum, lead and tin. As standard equipment it has an air-pressure gooseneck, but a plunger-type goose-



neck can be applied. Effective capacity of the standard air gooseneck is 5 lb. in zinc alloy, but oversize goosenecks are available. The metal pot capacity is 300 lb. in zinc alloy. Ejection of the castings is automatic with the opening of the dies.

Die-Casting Machines, Hydraulic

Reed-Prentice Corp., Worcester, Mass. (Vol.79,p.634.)

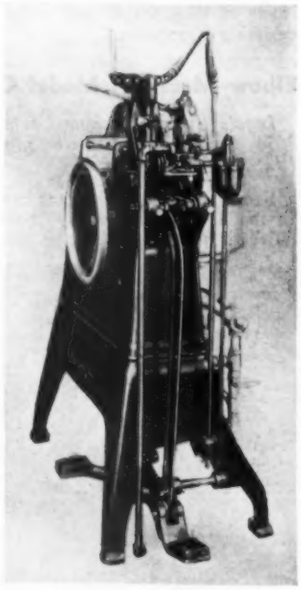
The machine is hydraulically operated throughout with one standard Vickers oil pump. The machine is arranged so that it can be operated either manually or automatically. Three sizes

have piston diameters as follows: 2½-, 3½- and 4½-in. Pressures are 4,900, 11,000 and 16,000 lb., respectively.

Die-Casting Machine, No. 315, "Kippcaster"

Madison-Kipp Corp., Madison, Wis. (Vol.79,p.871.)

Similar in construction to the No. 115-GF, except that it has an air gooseneck instead of a displacement - plunger type

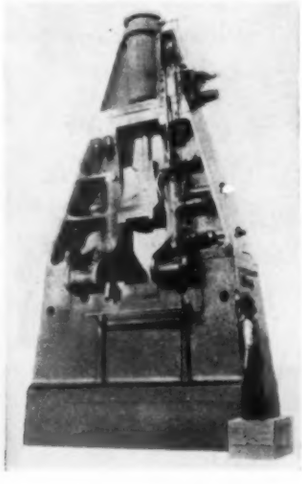


gooseneck, the No. 315 Kippcaster is semi-automatic and fully pneumatic in operation. Fire pot is gas-fired.

Drop Hammer, Steam, Model "E"

Chambersburg Engineering Co., Chambersburg, Pa. (Vol. 79,p.930.)

To attain correct impact velocity and quick pick-up on the Model "E" an improved cylinder and valve were designed. The latter is a bal-



anced slide valve with fluid passages so proportioned that correct speeds are attained without "wire drawing" steam or air. This principle of design secures higher mean effective pressures in the cylinder. The base of the frame lips the anvil to form guides of a thrust shoulder, to resist twisting which is particularly important in long forgings or where the final impression is slightly off-center in the dies. "Cecolloy," a nickel-molybdenum, air-furnace iron alloy, is used for the cylinder of the Model "E," because of its strength and wear-resisting properties.

Elbow Machine, Model C

Ingals Elbow Machine Corp., 2634 Fullerton Ave., Chicago, Ill. (Vol.79,p.936.)

From 500 to 1,000 elbows can be made in an 8-hr. day from finished smokepipe 22 gage and

lighter. Two men have room to work at the machine. The elbows are airtight at the bead seams.

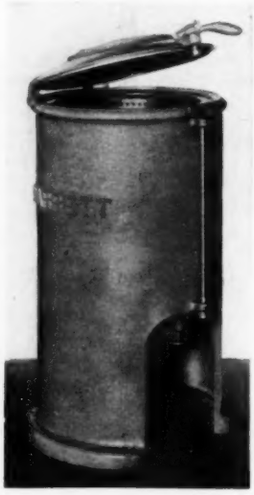
Enameling Machines

Leon J. Barrett Co., Worcester, Mass. (Vol.79,p.711.)

The "Filwhirl" is furnished as a single-spindle model, under-driven with removable pan. A removable wire-mesh basket, closely fitting the pan, is made with a lifting bar across its center.

The Grafton type centrifugal

is a self-contained motor-driven unit, size No. 0, useful both for laboratory work and for small work in regular production.



The containers are 12 in. or less in diameter. This machine was designed for small watch and similar parts.

Extruding Machine, Cap-Screw and Bolt Trimming

Federal Press Co., Elkhart, Ind. (Vol.79,p.343.)

The No. 3 trimmer is built for automatically trimming cap-screws and bolts, and also for extruding. The machine illustrated will handle blanks from ¼ to 2½ in. in length on all di-

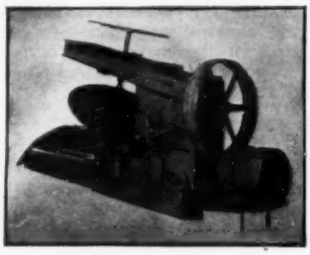
ameters ⅝ in. and smaller at the rate of 140 blanks per min.

The frame, flywheel and ram of this machine are built on the lines of standard punch presses. The hopper is paddle wheel type. By inclining this machine 35 deg. from the vertical, short transfer movements and high speed are gained.

Flanging Machine, High-Speed

Blue Valley Machine & Mfg. Co., Kansas City, Mo. (Vol. 79,p.839.)

A high-speed flanging machine for boilers and tank heads, either flat, bulged, concave or round, provides unusually high flanging speeds. Only one min-



ute is required for making a 2½-in. flange on a 12-ft. diameter flat head ¼ in. thick. Capacity of the six machines is from 30-gage thickness, 12-in. diameter to ⅜-in. thickness and 20-ft. diameter.

Forging Presses and Rolls

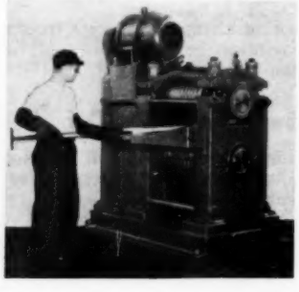
Ajax Mfg. Co., Euclid Branch P. O., Cleveland, Ohio. (Vol. 79,p.276.)

These fast-operating machines are designed for accurate forging work and precision hot or cold coining of forgings. The presses are controlled by a pneumatic clutch of the same type as used on the company's horizontal-type forging machines. Main shaft is of the

full-eccentric type. Bearings are of the adjustable, split-sleeve type. The ram derives improved alignment from a top extension bearing at the rear side of the crown rib.

A wedge in the bottom die seat provides for fine die adjustments without shimming. A central knock-out in the ram is mechanically operated as well as the multiple knock-out in the die seat.

The "Wide Adjustment" forging rolls are made in three sizes. As the name implies,



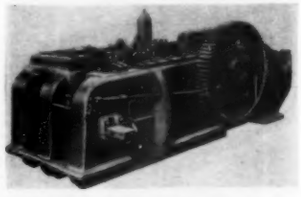
these rolls are characterized by "wide adjustment" between the semi-cylindrical dies in which the forging impressions are sunk. This construction makes possible a greater number of die redressings and results in longer die life and decreased maintenance. It is accomplished through an unusual gearing arrangement wherein the meshing of the roll gears is not disturbed by the 2½ to 4 in. adjustment provided, as contrasted with the old arrangement with ⅜ to ¾ in. adjustment. The top roll housings are adjustable vertically for proper forging thickness.

Forging Machine, All-Steel, No. 35

Acme Machinery Co., Cleveland, Ohio. (Vol.79,p.688.)

This all-steel forging machine features a friction cushion drive. There is no backlash as the heading tool has positive movement to and from the work. The air-controlled clutch facilitates die setting as it permits inching the machine slowly.

Machines are double back-geared with outboard bearings

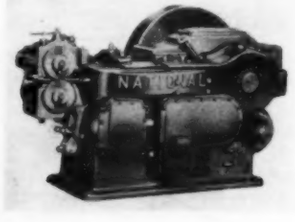


for most of the trunnion shafts. Header slide is of the full suspended type. The movable die slide is made of steel and has the same suspended-type slide features as the header slide. Adjustment of movable die can be made in order to match the position of the stationary die.

Heading Machine, Open-Die

National Machinery Co., Tiffin, Ohio. (Vol.79,p.340.)

The addition of a relieving grip motion enables the cold header to operate either as a relieving-grip or solid-die machine. Wire is fed through a shearing bush, cut off, carried on over, and pushed back into the die just as in the case of a solid-die machine. By means of an adapter, the machine can be equipped with solid dies. The grip is locked in closed position, so that the die is rigidly held in alignment. The ma-

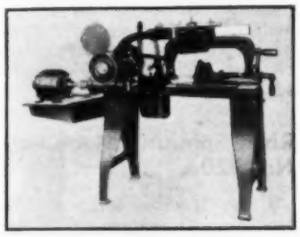


chine may also be operated with split dies which are clamped solid.

Hacksaw, Power

W. Robertson Machine & Foundry Co., Buffalo, N. Y. (Vol.79,p.572.)

On the No. 3 Economy motor-driven hacksaw, a complicated clutch mechanism is eliminated by a projecting finger which contacts a push-button

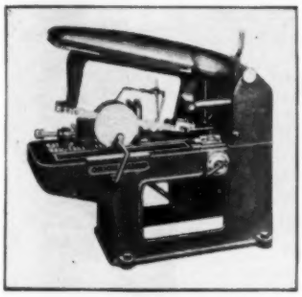


switch and stops the motor as well as the frame. The machine has a 6-in. stroke with a capacity of 6x6 in. It uses blades from 12- to 14-in. in length.

Hacksaw, Power, "Orion"

Marburg Bros., 90 West St., New York, N. Y. (Vol.79,p. 637.)

The entire sawing operation is automatic. Saw pressure is hydraulically controlled, being lightest at beginning and ending of cut and greatest at the cen-



ter of bar stock. Chatter and vibration are eliminated, because the bow is rigidly guided by two large gibs on either side.

Hacksaw, Power

Peerless Machine Co., Racine, Wis. (Vol.79,p.707.)

A 6½ in. x 6½ in. improved high-duty metal sawing machine can be furnished with or without the hydraulically operated automatic bar feed with conveyor shown. Strokes, 60, 100 and 145 per min. The blade ca-

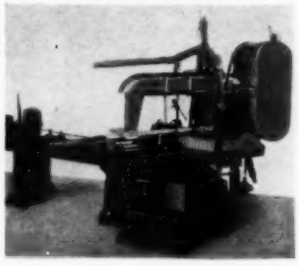
pacity is 10 to 14 in. inclusive. Pushbutton control is standard equipment.

Hacksaw, Power

Rasmussen Machine Co., 1014 Eighth St., Racine, Wis. (Vol. 79,p.747.)

This machine may be operated as a fully automatic unit when employed for cutting off duplicate pieces from bar stock, or it may be set to complete a cut and stop. Either square or angular cuts may be made.

The saw cuts on the draw stroke and a cam mechanism lifts the saw clear of the work for each return stroke. As the saw reaches the end of its return stroke, a cam in the feed

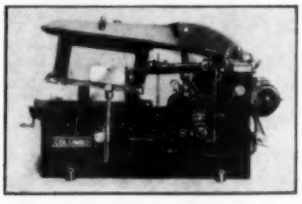


mechanism returns the saw to the cutting position it had reached on the previous stroke. Another cam then supplements the action of the compensating spring for feeding. When the cut has been completed, the feed is tripped and quick return of the saw engaged. This returns the saw to the starting point, releases the vise and puts the machine into readiness for starting a new cycle of movements.

Hacksaw, Power

Columbo Machine Co., 114 Liberty St., New York, N. Y. (Vol.79,p.906.)

Columbo hydraulic feed metal hacksawing machines are built in five sizes, from 8x8 in. to 16x16 in., inclusive. Feed pres-

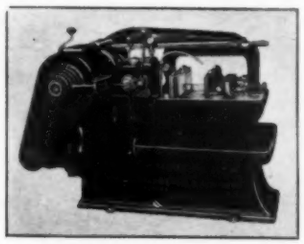


sure is by means of a hydraulic pump. The blade cuts on the pull stroke, and the saw frame is automatically lifted for the return stroke.

Hacksaw, Power

Racine Tool & Machine Co., Racine, Wis. (Vol.79,p.835.)

This metal cutting machine uses hydraulic feed and control. Capacity is 6x6 in. square, or 6⅝ in. round with vise straight, and 4½x6⅝ in. with vise set at

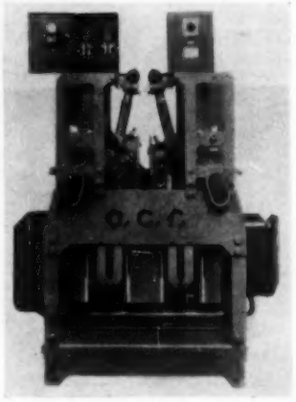


45 deg. for angle cutting. Cutting rate of 3 to 4 sq.in. per min. is claimed in cutting cold-rolled steel. The flexible hydraulic feed automatically adjusts itself to pressures built up against the blade.

Heater, Bar, Electric

American Car & Foundry Co., 30 Church St., New York, N. Y. (Vol.79,p.62.)

Stock is placed in a hopper, automatically fed between the copper jaws or electrodes, heated to the temperature from which the electric eyes are set and automatically released into



a receptacle. This heater will heat stock from ¼ to 1½ in. or larger, if desired, and will place the heat on the end or at any other point on the bar. Any size stock between 4 and 19 in. long can be handled.

Heater, Stud

Taylor-Winfield Corp., 14307 Third Ave., Detroit, Mich. (Vol.79,p.477.)

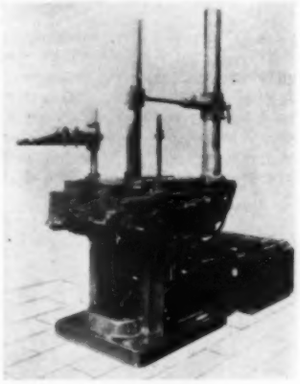
This machine was designed to heat tapered studs made from screw machine stock for subsequent hot forming in a press. The dial mechanism is operated by a small motor. Upper electrodes are brought to bear on

the studs by means of an air cylinder. All movements are synchronized so that no attention from the operator is necessary. The process is well adapted to the production heating of wire or slugs from which bolts are made, especially for metals not suitable for cold forming. Production, 1,000 pieces per hr.

Keyway Cutter and Slotter

Morton Mfg. Co., Muskegon Heights, Mich. (Vol.79,p.219.)

The work remains stationary at all times. A ratchet feed mechanism provides feeds from 0.001 to 0.020 in. per stroke.



Up to 1 in. taper per ft. can be obtained. This machine can be furnished in sizes ranging from 30 to 60 in. cutting stroke.

Lathe, Speed

Oliver Machinery Co., Grand Rapids, Mich. (Vol.79,p.254.)

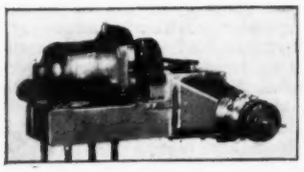
The No. 159 speed lathe is designed for use in pattern shops. The lathe has a 12-in. swing over the bed. Drive is by a ½-hp. motor through a V-

belt on adjustable cone sheaves. Any speed from 800 to 2,400 r.p.m. is available.

Metal Spray Equipment

Gillord Sales Corp., 420 Lexington Ave., New York, N. Y. (Vol.79,p.904.)

The Gillord metal spray is capable of handling 12 to 15 lb. of steel or steel alloys per hour, and a correspondingly greater amount of other metals,

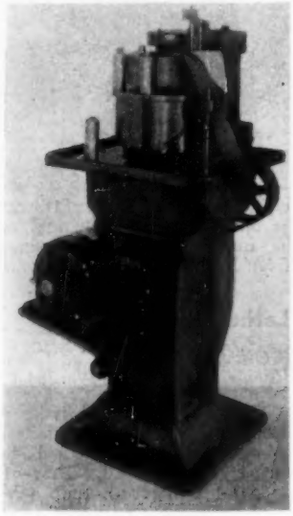


depending on their melting points. All the gases and air are handled through metering jets. Operator has control of the wire feed through an adjustable feeding device. This unit weighs approximately 90 pounds.

Marking Machine, Tube

Noble & Westbrook Mfg. Co., 20 Westbrook St., E. Hartford, Conn. (Vol.79,p.219.)

A heavy-duty production marking machine is built for marking an inscription consisting of approximately 200 letters and figures on thin tubes up to 4 in. long and 1¼ in. diameter. A carrying dial is provided with six stations. The pressure dial,



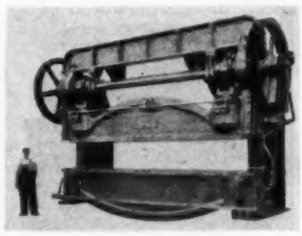
working above the carrying dial, gives uniform pressure as the tubes pass between the marking dies and the pressure roll. Production is 60 tubes per min.

Punch, Multiple No. 33-K

Williams, White & Co., Moline, Ill. (Vol. 79,p.413.)

This No. 33-K multiple punch was built to accommodate many different operations. Its essential characteristics—long stroke, high die space, long adjustment, and overhanging ram—make it possible to use this machine with suitably designed dies, as a press brake, a plate shear or for straight-line or group punching operations. The press has a capacity of 250 tons.

Stroke of slide, 5 in.; adjustment of die space, 8 in.; die space, stroke down, adj. up, 22 in.; distance between housings,

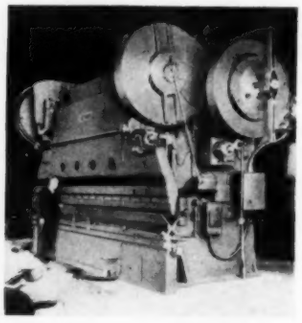


176 in.; length of ram, 184 in.; width of table face, 20 in.; depth of throat, 11 in.; strokes per minute, 25.

Press Brake

Cincinnati Shaper Co., Cincinnati, Ohio. (Vol.79,p.60.)

The largest machine of its type ever built for bending, flanging, forming and multiple punching is constructed to handle steel plates up to 2 in. in thickness in lengths up to 12 ft. and ¾ in. plates in lengths up to 18 ft. The ram has a stroke of 6 in. and an adjustment of 6 in., with a distance of bed to ram, stroke down and adjustment up, of 14 in. Two speeds are 5 or 20 strokes per



min. Safe working loads up to 1,000 tons can be developed by the machine. Weight, 145,000 lb.

Riveting Hammer, Special

High Speed Hammer Co., 305-321 Norton Street, Rochester, N. Y. (Vol.79,p.340.)

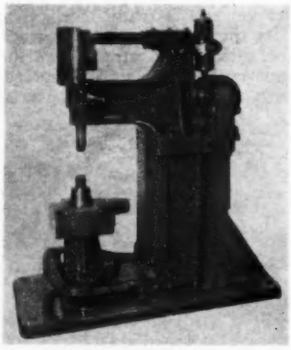
Trimmed butt welds on sheets of No. 20 gage steel used in the manufacture of automobile bodies are flattened at the rate of 70 in. per min. in this special riveting hammer, No. 5½B. On these sheets the riser, which

has been trimmed, averages about 0.004 in. per side. The hammering operation quickly reduces this thickness to the gage of the metal.

Riveting Hammer, No. 7B

High Speed Hammer Co., 305-321 Norton St., Rochester, N. Y. (Vol.79,p.636.)

This unit will cold head 1½-in. diameter mild steel rivets, forming oval heads, in 30-sec. each, and ¾-in. diameter rivets



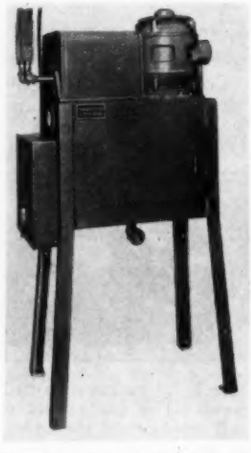
in 7 sec. each. These hammers are also capable of performing many operations of swaging and forming. Horizontal gap, 15½ in., floor space, 28x64 in., height, 74 in.

Riveter, Hydraulic, Portable

Hannifin Mfg. Co., 621 S. Kolmar Ave., Chicago, Ill. (Vol.79,p.702.)

A production riveting machine operated hydraulically and comprising a portable yoke-type hydraulic press and an automatic hydraulic pressure generator, connected by high-pressure hoses and electric control cable, has been brought out. The portable yoke press weighs 54 lb. and develops a maximum pressure of 35,000 lb. to head the rivet. The throat of the yoke is 6x6 in., and the ram stroke 3 in.

Control of the riveting operation is by a single push-button at the top of the press handle. Depressing this button actuates the hydraulic pressure generating unit and its control valves, and the riveting cycle is completed automatically. Complete riveting cycle is said to be 2½ sec. per rivet.



Rivet Spinning Machine, No. 120A

Grant Manufacturing & Machine Co., Bridgeport, Conn. (Vol.79,p.774.)

Equipped with a four-spindle head, the No. 120A noiseless rivet spinning machine is set up for spinning heads on four posts in a clock frame simultaneously. The head can be built with two to six spindles depending upon the diameter of the rivets to be spun, and the center-to-center distance required.

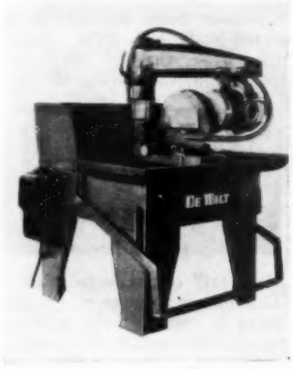
The horizontal motor at the rear of the machine furnishes the power for the operation of the automatic clamping mechanism.

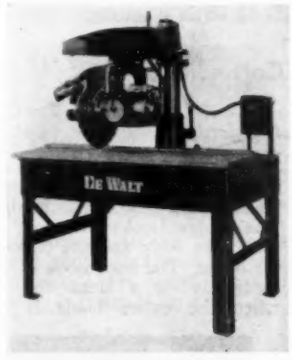
Left—Automatic hydraulic pressure generator. Below—The portable yoke press delivers 35,000 lb. pressure

Sawing Machines Metal and Wood

De Walt Products Corp., Lancaster, Pa. (Vol.79,p.710.)

Metal cutting machines utilize the overhead principle and are designed to use either saw blades or abrasive wheels directly driven from the motor shaft or by back gear. The cutting tool





travels parallel to the table above the work, and will make cuts up to 24 in. wide by 3 in. deep.

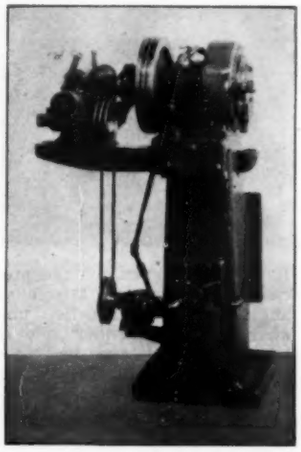
The woodworking machine is capable of 29 different woodworking operations, most of the tools being attached directly to the motor shaft.

Swaging Machines

Langelier Mfg. Co., Providence, R. I. (Vol.79,p.745.)

Reduction in the diameter of tungsten wire used in electric light bulbs, by swaging, is accomplished on one machine. The wire can be swaged either hot or cold. A belt-driven roll feed is mounted on a projecting arm at the rear of the flywheel.

The company's No. "L" swaging machine, which is the largest of its type ever constructed, is capable of tapering or reduc-

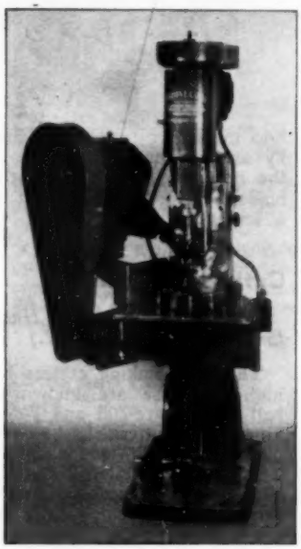


ing work to a finished diameter of 6 in. A fixed roll principle of construction is used in the design of the swaging head. Work is fed into the dies by a hydraulically operated holder.

Screw Inserting Machine

Bodine Corp., 1720 Fairfield Ave., Bridgeport, Conn. (Vol. 79,p.741.)

Adaptable to a wide variety of work, the No. 61 automatic screw inserting machine is equipped with one or more hoppers for the purpose of feeding

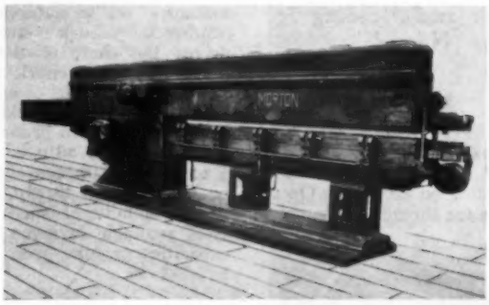


the screws to the screwdriver spindles. The machine is built with either a dial or plain type of knee. Capacity is ¼ in. machine screws. Special attachments accommodate larger sizes.

Trimming Machine, Flash, 120-In. Stroke

Morton Mfg. Co., Muskegon Heights, Mich. (Vol.79,p. 254.)

This high-duty draw-cut flash trimming machine will trim the flash from butt-welded sheets having a seam up to 120 in. in



length. It is designed to trim stock as thin as 20 gage. Cutting and return speed are approximately 60 ft. per min. An electrical timing device operates a solenoid valve to blow air across the dies to clean them. A solenoid-operated, centering and lighting device is used within the upper ram.

Trimming Machine, Flash

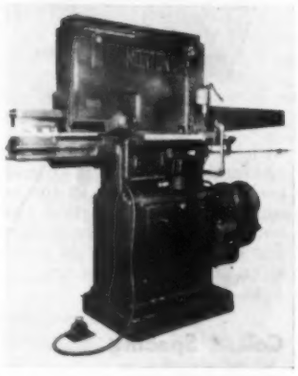
Morton Mfg. Co., Muskegon Heights, Mich. (Vol.79,p.185.)

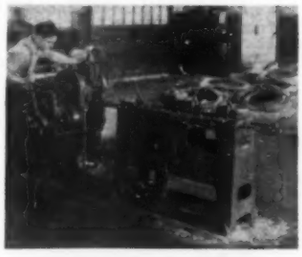
This draw-cut, flash-trimming machine is designed for removing the flash from butt-welded steel rings, such as automobile wheel rims. It will take a width of seam up to 12 in. and stock thicknesses from 24 gage to ⅜ in. Two reciprocating rams are operated by means of hydraulic cylinders.

Wire Drawers, Hogue

Ajax Mfg. Co., Euclid Branch P. O. Cleveland, Ohio. (Vol. 79,p.28.)

The Hogue wire drawer is an attachment for cold-heading machines to cold draw and coat hot-rolled, pickled and limed rod





as it feeds into the machine. The stock is fed intermittently by a connection to the machine. Standard sizes are No. 0, 1, 2, 3 and 4 for drawing ¼ to ⅝ in. diameter rod.

MACHINE ACCESSORIES

Boring Tool

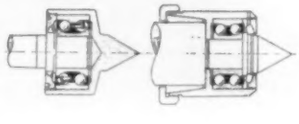
F. A. Kershaw, Kent, Ohio. (Vol.79,p.715.)

The holder has a 90-deg. groove with the faces of the groove at 45 deg. to the vertical, the center being at the proper height for the lathe. Provision is made for setting the holder parallel with the spindle, when the compound rest is set at 0 deg. or at 30 deg. for thread cutting, and the clamp nut is so attached that in either position the holder can be put in place or removed as easily as the regular tool post. The bars are made in six sizes from ½ to 1¼ in.

Centers, Ball-Bearing

Ready Tool Co., Bridgeport, Conn. (Vol.79,p.474.)

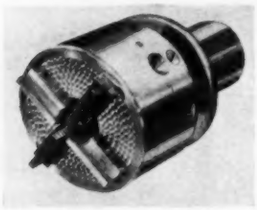
The "Red-E" ball-bearing center incorporates New Departure double-row, angular-contact ball bearings. Another feature is the short overhang so that the work is brought close to the tailstock. Two types: the outside-of-the-spindle type and shank type.



Chaser and Holding Block, "Namco"

National Acme Co., Cleveland, Ohio. (Vol.79,p.251.)

An interchange chaser blade and holder has the blade chaser slipped into a slot in the block, protruding on each end. On one end are the threads of the chaser

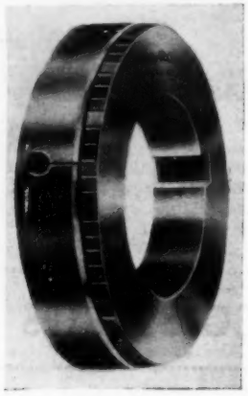


with the ground cutting edge, and on the other end is ground a heel which is seated in the cup and assures opening action. Only two sets of blocks are required for the entire range of cutting sizes. Sizes available are from ¼ to 1 in.

Collar, Spacing

Dayton Rogers Mfg. Co., 1835 E. Franklin St., Minneapolis, Minn. (Vol.79,p.251.)

A spacing collar for milling machine cutter arbors is designed for accurate spacing of side milling cutters, gang mill-

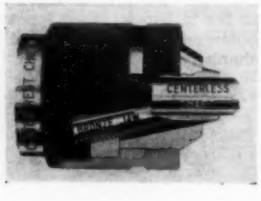


ing and various other multiple milling set-ups. Although the collars are graduated in thousandths, a quarter thousandth setting is easily obtained.

Chucks, Lathe

Jacobs Mfg. Co., Hartford, Conn. (Vol.79,p.341.)

These lathe headstock and center rest chucks are designed for toolroom jobs, such as turning centerless shafts and com-



mutators on armatures. The headstock chuck accurately drives the shaft in the lathe. The center rest chuck fits the tail stock by means of an arbor, and the armature is held on the bearing surface in bronze jaws. Chuck jaws are adjustable from ¼ to ⅝ in. Headstock chuck can be furnished to thread directly to the spindle of small lathes. It is available in seven models, capacities ranging from ⅛-⅝ in. to $\frac{15}{16}$-2¼ in.

Chuck, Magnetic, Swiveling, Type MC

O. S. Walker Co., Worcester, Mass. (Vol.79,p.541.)

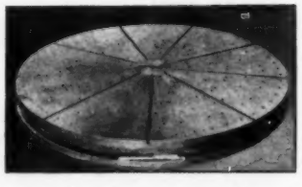
This chuck is arranged for locating 90 deg. for retruing the top face, and to intermediate angles for grinding bevels on machine knives. It can also be rotated 20 deg. in an opposite

direction. Both faces have T-slots. Magnetic surface on the face is 7¼ in. wide, and on the top, 6¾ in. wide. Chucks of this type can be built in single units up to 10 ft. in length. The chuck is of triangular cross-section. Rotation is accomplished by a hand wheel, not shown.

Chuck, Magnetic, 66-In.

O. S. Walker Co., Worcester, Mass. (Vol.79,p.604.)

The 66-in. rotary magnetic chuck illustrated is for the special Niles boring - mill - type grinder used by the Timken Roller Bearing Company to

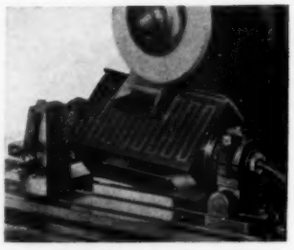


grind the large cups and cones of heavy-duty Timken bearings. (*AM*—Vol. 79, page 382). The chuck weighs 5,500 lb. and requires 2,300 watts. A wide variety of auxiliary rings are used with the chuck.

Chuck, Magnetic, Duplex

Taft-Peirce Mfg. Co., Woonsocket, R. I. (Vol.79,p.932.)

A tilting and swiveling magnetic chuck known as the "Super-Power Precision Duplex

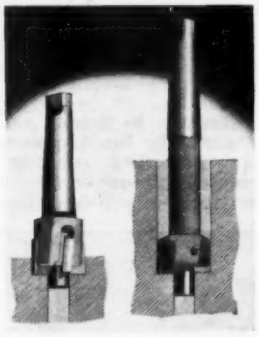


Base," is designed for the precision grinding of compound angles. The magnetic unit swivels 90 deg. either side of horizontal and can be tilted along its axis from 0 to 14 deg.

Counterbore, "Zee-Lock"

Ingersoll Milling Machine, Rockford, Ill. (Vol.79,p.931.)

Two designs are offered: one for shallow boring or spotfacing operations, and another for deep boring. Serrations are broached



into the cutter housing so that by moving the cutter blade to the next slot in sequence, the blade is moved out only part of a serration.

Cutters, Die-Sinking

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.637.)

Three die-sinking cutters for high-speed use are known as ball-end, square-end and 7-deg. taper. The cutters can be operated at spindle speeds up to 3,600 r.p.m. in tough die steels. The ball- and square-end cutters are right-hand cut. Both are available in thirteen sizes, ranging from ⅛ to 1¼ in. Length of cut varies from ¼ to 3½ in. on the ball-end type and from ⅛ to 2¾ in. on the square-end.

The 7-deg. taper cutters are available in twelve sizes ranging from ⅛ to ½ in. This normal

size designates the diameter of the ball at the small end. The 7-deg. taper is on one side, the included angle being 14 deg. These cutters, also are right-hand cut and right-hand spiral.

Cutters, End-Mill

Ingersoll Milling Machine Co., Rockford, Ill. (Vol.79,p.713.)

The "Zee Lock" cutter blade has now been applied to inserted-blade end mills. Blades may have tips of high-speed steel, cobalt high-speed steel,

"J-Metal" or cemented carbide. This makes a cutter which compares in cost with the solid cutter in the small sizes and is somewhat cheaper in the larger sizes. Cutters are made as small as 1⅛ in. in diameter.

Cutter, Face-Mill

Ingersoll Milling Machine Co., Rockford, Ill. (Vol.79,p.381.)

The "Zee Lock" cutter blade is securely retained in the cutter housing by a Z-shaped wedge. The wedge hooks the front of the cutter body and the back of the blade. The back hook of the wedge is on a slant so that when the cutter blade is re-

inserted and moved out a serration, it moves forward a slight amount to compensate for the face wear. The main adjustment is radially, which is in the direction of main wear.

Ingersoll face mills are furnished with the "Zee Lock" cutter blade of special high speed steel, super-cobalt high speed steel, J-Metal Stellite, or tipped with cemented carbide.

Cutters, Side-Milling

Ingersoll Milling Machine Co., Rockford, Ill. (Vol.79,p.475.)

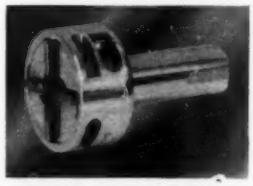
The "Zee Lock" cutter blade has been applied to inserted-

blade side-milling cutters. Half-side milling cutters incorporate the "Zee Lock" cutter blade. Plain side and interlocking cutters, with plain wedge locks, are also offered. Cutters are made as small as 4 in. in diameter by ⅛ in. wide.

Diehead, "H & G"

Eastern Machine Screw Corp. (Vol.79,p.677.)

The solid-adjustable diehead makes it possible for manufacturers who are accustomed to using solid dies of various types

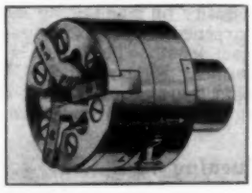


to take advantage of the low cost and accuracy of the insert chaser. Three sizes: 0 to ½; $\frac{17}{32}$ to ¾ in.; and $\frac{25}{32}$ to 1 in.

Diehead for Light Work

Geometric Tool Co., New Haven, Conn. (Vol.79,p.746.)

The Style EJ2, solid-adjustable diehead cuts small diameter short-length threads. Two types: one with a conventional plain shank and the other with a threaded back part. These die-



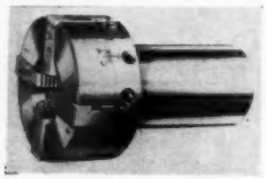
heads will cut threads from $\frac{1}{16}$ to ¼ in. in pitches 20 per in. or finer.

The Style EJ2 diehead for the OOG Brown & Sharpe automatic screw threading machine is similar to the plain shank tool with the exception of the back part, which is furnished with a capped hole for application to a threading spindle.

Diehead, Style DJ

Geometric Tool Co., New Haven, Conn. (Vol.79,p.413.)

Style DJ solid-adjustable die-

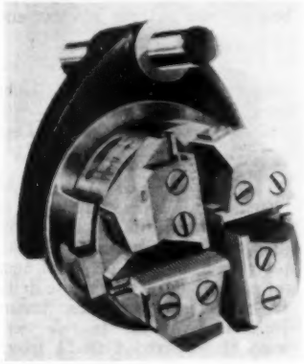


head is designed primarily for cutting short threads where the time required for backing off is not important. The tool is adjusted to the desired threading size by loosening one screw and tightening another. The die is built in size from $\frac{1}{16}$ to 6 in. in diameter.

Diehead, Revolving

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.439.)

The revolving diehead is an adaptation of the ¾-in. "Lanco" head, but has a standard capacity up to 1¼ in. American taper pipe thread with a maximum thread length of 1¼ in. By using special oversized chaser

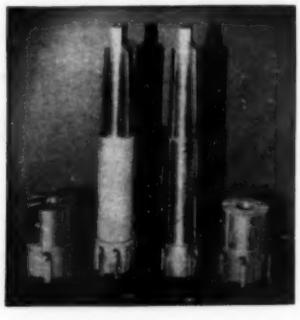


holders, diameters up to 2¾ in. can be cut with a maximum thread length of 1½ in. Any degree of taper can be provided up to 2 in. per ft. The taper cutting action is obtained through a cam which is integral with the operating ring.

Drills and Reamers, Core, "Zee-Lock"

Ingersoll Milling Machine Co., Rockford, Ill. (Vol.79,p.840.)

The "Zee-Lock" cutter blade has been applied to multi-blade boring tools. Core drills are made either with a shank or in the shell type. Coarsely spaced blades in the core drills are set with rake and shear for free

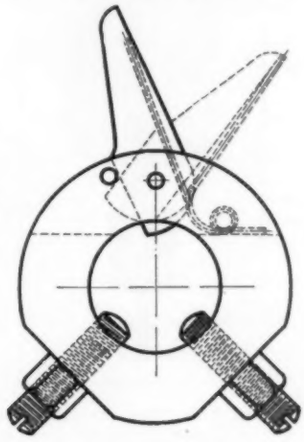


cutting. Reamers, in either shank or shell types, have more blades than the core drills. They are set straight or with negative shear angles and are irregularly spaced.

Grinder Dog, Quick-Acting

Ready Tool Co., Bridgeport, Conn. (Vol.79,p.898.)

To facilitate quick handling of short pieces, the quick-acting-cam grinder dog has only one moving part. The cam and extension are hinged. Thumb pres-

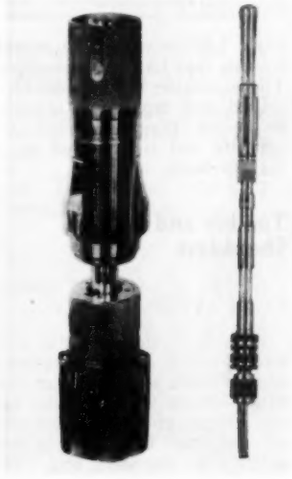


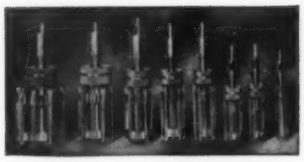
sure on the cam extension withdraws the cam and allows work to be placed in position quickly. Upon releasing the pressure, the spring forces the cam down against the work.

Hones, Cylinder

Hutto Machine Div., The Carborundum Co., 515 Lycaste Ave., Detroit, Mich. (Vol.79, p.696.)

The Model RA high production connecting rod hone permits the honing of more than one bore at a time by using a suitable fixture of the floating type. The lower end of the hone serves as a pilot for aligning the bores and piloting the hones.





This type is fitted with segmental abrasives. A feature is the separate adjustment built in for expanding the fiber guides separately and independently of the stone adjusting mechanism.

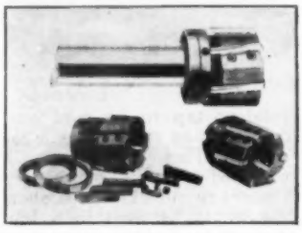
For honing cylinders of extreme length to a high finish and for controlling the hones manually, a series of finishing hones has been developed. These hones differ from the automatically controlled type only in that expansion and contraction of the abrasives are accomplished manually.

The same type of independent adjustment of the fiber has been applied to the line of automatic finishing hones developed particularly for finishing on a high-production basis cylinders that have been diamond bored or otherwise fine bored.

Reamers, Serrated Blade, "Camlock"

Pratt & Whitney Co., Hartford, Conn. (Vol.79,p.773.)

"Camlock" reamers are available in both shell and shank types. Serrations on one side of each blade fit into the corresponding serrations in the reamer body. Two cams lock



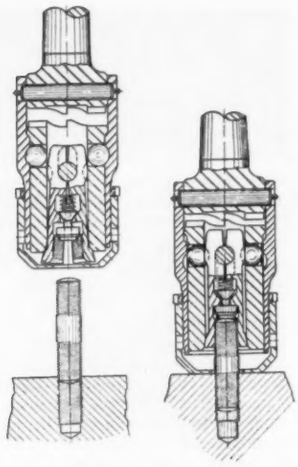
each blade in place. Nuts at the back end of each blade permit easy adjustment for size. The blades are pushed forward to increase the cutting diameter. This permits the reamers to function equally well in through holes, blind holes or against shoulders. Size range, 1¼ to 6 in.

Stud Setters, Self-Opening

Modern Tool Works, Rochester, N. Y. (Vol.79,p.874.)

In Style B self-opening stud setter, the jaws remain open until contact of the stud with the stop compresses the stud stop spring and brings the threads in the jaws into full register on the stud. At this point the balls are locked in the driving position and the driving clutch is engaged.

When the stud is set to within ¼ in. of the height desired, the stop collar contacts with either the work or the plate govern-

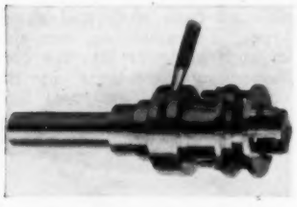


ing the height of the stud and the clutch is disengaged.

Tap, Combination, Type "C"

Murchey Machine & Tool Co., Detroit, Mich. (Vol.79, p.679.)

The Type "C" combination tap may be used as a stationary tap for hand screw machines or turret lathes, or the handle may be removed, converting it into a

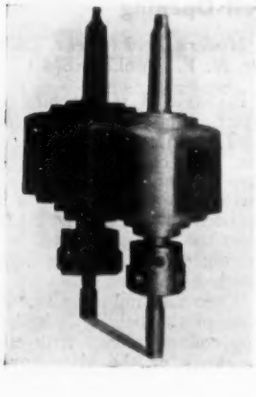


rotating tap to be used on a drill press or rotary-spindle machine. These taps can be equipped with overhanging chasers to cut close to a shoulder or to be used in a blind hole.

Tapping Attachment

Chas. L. Jarvis Co., Gildersleeve, Conn. (Vol.79,p.190.)

The Biax No. 2 tapping attachment has a capacity from ¼ to ¾ in. and is entirely ball bearing equipped. Forward as well as reverse friction and



double reverse speed are provided. High speed is 3,500 r.p.m.

Tapping Attachment, "Ettco-Emrick"

Ettco Tool Co., 594 Johnson Ave., Brooklyn, N. Y. (Vol. 79,p.772.)

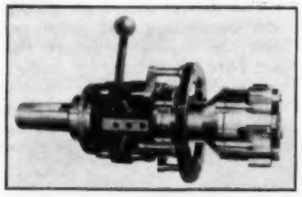
Two sizes: No. 100 for $\frac{5}{16}$-in. taps and No. 300 for ¼-in. taps. Sensitive cone friction clutches

are used to drive the tap. The entire mechanism is contained in an oil-tight case. Speeds, to 2,000 r.p.m.

Extension Link, Collapsible-Tap

Landis Machine Co., Waynesboro, Pa. (Vol.79,p.602.)

In order to tap threads longer than provided for with standard taps, a special link for use between the body and the head of Style LT collapsible taps and

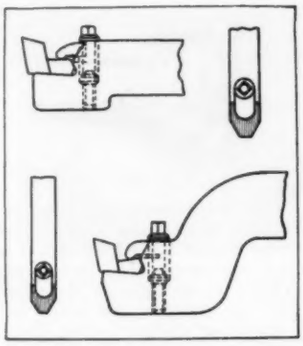


Style LM receding chaser collapsible taps has been developed. The extension link is machined, drilled and tapped on one end to fit the tap body while the opposite end is prepared to fit the tap head.

Toolbit and Holder, Shankless

O. K. Tool Co., Shelton, Conn. (Vol.79,p.679.)

An adjustable shankless toolbit and holder incorporates many of the firm's milling cutter features. It has the economies and advantages of the inserted-type of tool, but the strength and solidity of the solid tool. The



toolbits are of high-speed steel; the holders are of chrome-nickel alloy.

Toolholder, Angle-Type

C. A. Koza, 464 Augustine St., Rochester, N. Y. (Vol.79, p.346.)

This right-angle tool attachment is designed primarily for use in narrow spaces and close corners on machine repairs. By removing the screw-feed-end bearing and putting in short end

bearings, all tools will work in spaces the width of the body, plus the length of the drill. All tools have a 1 in. depth of feed on screw feed. Right angle drills are made in three sizes, having capacities of ¼ to $\frac{5}{16}$ in.; ⅛ to $\frac{3}{32}$ in.; and $\frac{1}{16}$ to $\frac{1}{32}$ in.

Toolholder, Threading, "Agrippa"

J. H. Williams & Co., 75 Spring St., New York, N. Y. (Vol.79,p.713.)

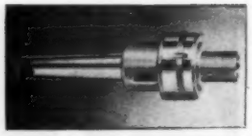
The threading toolholder is made in two sizes and designated by the Nos. 150 and 151. The formed-cutter is ground to

an included angle of 60 deg. and is backed off for proper clearance. For resharpening the cutter it is necessary to grind the top edge only.

Toolholder, Compensating, "Glenco"

J. C. Glenzer Co., 6463 Epworth Blvd., Detroit, Mich. (Vol.79,p.601.)

This toolholder automatically compensates for spindle misalignment, producing true and accurate tapped and reamed holes. Five stock sizes are made with capacities up to 5-in. tool



diameters, in types to fit hand and automatic screw machines, Garvin tappers, adjustable multiple spindles, and all drilling and tapping machines.

Toolholder, Parting

Inverted Toolholder Co., 1230 E. 109th St., Los Angeles, Calif. (Vol.79,p.509.)

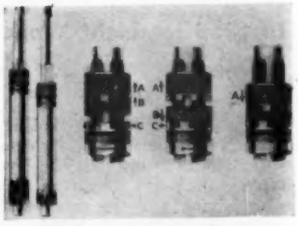
The holder for parting or cut-off tools is so designed that the tool is held in an inverted position, and the lathe or machine

spindle is run backward. This toolholder incorporates a wedge bit fastening that is simple to operate.

Toolholder, Variable Length

Eclipse Counterbore Co., 7410 St. Aubin Ave., Detroit, Mich. (Vol.79,p.739.)

Variable length holders are especially adapted for multiple-spindle operations when several holes are to be faced, counterbored or countersunk to identi-

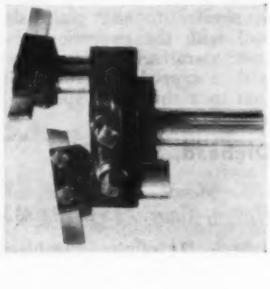


cal depths. They eliminate the necessity of maintaining cutters sharpened in sets of the same exact length. The 0.001 in. adjustment is accomplished by a compensating collar with driving lugs at both ends.

Turning Tool

R & L Tools, Nicetown, Philadelphia, Pa. (Vol.79,p.930.)

A turning tool, which can be used in a variety of ways uses



toolbits of standard size. Drilling is readily accomplished at the same time the piece is being turned, or the piece is centered while turning to provide concentricity.

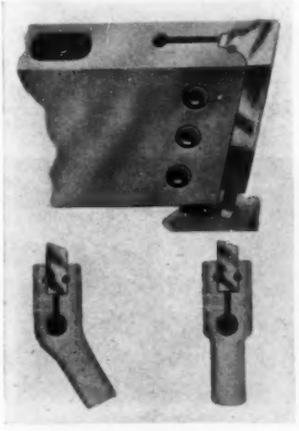
The tool can also be equipped with a bit for right-hand turning and a back rest or burnisher.

By replacing the burnisher with extra toolholders the device is converted into a balanced turning tool with two cutting edges. The adjustment lengthwise permits two diameters to be turned to any length within its capacity. Shanks are furnished to fit any machine.

Turning Tools, "Mitco"

Michigan Tool Co., Detroit, Mich. (Vol.79,p.933.)

"Mitco Pin Splice" tools use guide pins to locate the tool in the holder. The tool can be shifted up or down in the holder



to the correct position, using the pins as guides. For circular form turning, the new tools provide a degree of support under the cutting edge not usually found.

Vise, Down-Grip

C. R. Gier Co., 75 West St., New York, N. Y. (Vol.79, p.414.)

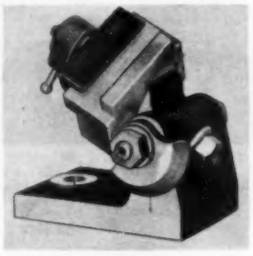
While gripping the work, the jaws exert a downward pull and force the work tightly against

its seat. This vise is available in fourteen models, including either plain or swiveling.

Vise, Angle, Universal

Covel Mfg. Co., Benton Harbor, Mich. (Vol.79,p.218.)

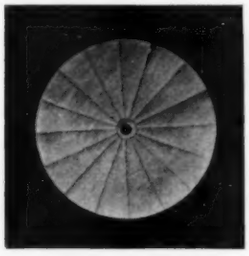
The universal angle vise is offered for use when grinding, milling and drilling at any angle. The work is held by a fulcrum clamp. Two models are available: Style A having a capacity of 1¼ in. and Style B a capacity of 2½ in.



Wheels, Buffing

Udylite Co., Detroit, Mich. (Vol.79,p.905.)

The Udylite Humidifying Process introduces proper moisture content into the fibers of the cloth to give it maximum



tensile strength and wear-resisting qualities. The buffs are sealed in moisture-proof paper.

Wheel, Polishing, Columbian Fiber

Carborundum Co., Niagara Falls, N. Y. (Vol.79,p.901.)

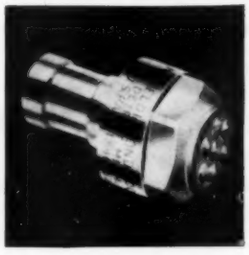
Advocated for use in connection with Aloxite Brand TP and Carborundum polishing grain for all classes of metal

finishing, the Columbian fiber polishing wheel is produced by combining vegetable fiber with a tough, resilient bonding agent. Three densities: soft, medium and hard.

Wheel Dresser, Diamond

Koebel Diamond Tool Co., 1200 Oakman Blvd., Detroit, Mich. (Vol.79,p.342.)

The diamonds in this line of dressing tools are embedded in



"Koebelite," a metal which fuses below the critical temperature of the diamond and has practically the same coefficient of expansion. A "Multi-Point" tool brings from two to five diamonds in contact with the grinding wheel. A "Multi-Edge" dresser has three diamonds on a line for producing a high finish on the wheel. Three, four or five diamonds are mounted in sequence on the axis of the "Multi-Stage" dresser. After the first diamond is used up, the holding metal is ground to expose the next diamond.

Wheel Dresser, Diamond

F. F. Gilmore & Co., 112 Dartmouth St., Boston, Mass. (Vol.79,p.508.)

"Trumore" diamond grinding wheel dressers have a ball joint. Thus, the operator can loosen one nut and bring a sharp corner of the diamond into correct position against the wheel. The nib can be turned in any direction and rotated.

Wheel Dresser, Diamond

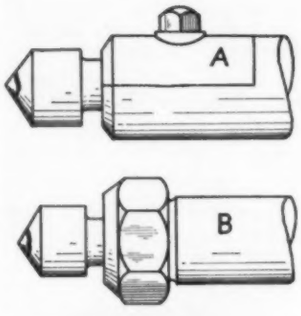
Carboloy Co., Inc., 2985 E. Jefferson Ave., Detroit, Mich. (Vol.79,p.932.)

This grade contains an extra-coarse mesh of diamonds and has been developed to increase performance on the larger and harder grades of grinding wheels used on surface, cylindrical and centerless grinders.

Work Driver, Lathe

Seneca Falls Machine Co., Seneca Falls, N. Y. (Vol.79, p.702.)

This automatic work driver cuts dogging time, so that one operator can run one or more machines. Eccentric driving jaws are mounted on a guided



"Trumore" wheel dresser

Carboloy wheel dresser

Seneca Falls work driver

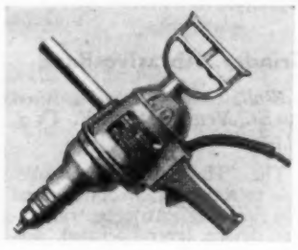
slide which is free to adjust itself to any eccentricity between the center and the outside diameter of the work, thus balancing the gripping pressure of the jaws and eliminating all strain on the head center.

PORTABLE TOOLS

Drill, Electric, Type OB-5

Signal Electric Mfg. Co., Menominee, Mich. (Vol.79, p.221.)

A ¼-in. Type OB-5 has breastplate-type handle, with detachable pipe handle. Over-all length is 16½ in., net weight, 14 lb.



Drill, Electric, Portable

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (Vol.79,p.637.)

This tool, the U-14, in the ¼-in. capacity, and the U-13, in the ⅜-in. capacity, will drill

through steel ¼ in. thick in 5 sec. Either fits easily in one hand, weighs 3½ lb.

Drill, Electric, 3/16-In.

Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. (Vol.79,p.344.)

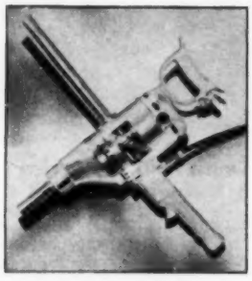
This No. 815 universal tool is rated at 3/16 in., weighs 4 lb. Length over-all, 7½ in. Ball

bearings are employed throughout. The chuck screws onto the threaded spindle.

Drills, Electric, Ball-Bearing

Skilsaw, Inc., 3341 Elston Ave., Chicago, Ill. (Vol.79, p.841.)

New models are 3/16 and ¼ in. high production types, also 5/16, ⅜ and ½ in. heavy-duty models

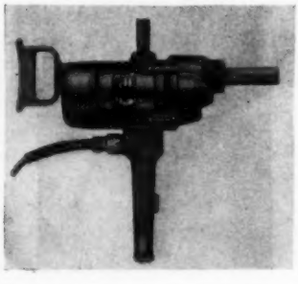


for drilling and reaming. Housings are die-cast aluminum alloy.

Drills, Electric, Universal

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. (Vol.79,p.934.)

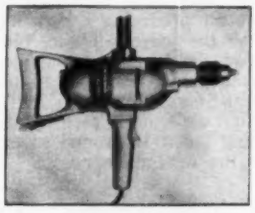
Drills are made in sizes from 3/16 to 1 in. Typical features of the heavy-duty, side-handle drills and pistol-grip drills are a high-torque, high-powered motor, helical armature gearing, and safety-type trigger.



Drill, Electric, "Junior" ½-In.

Black & Decker Mfg. Co., Towson, Md. (Vol.79,p.904.)

The ½-in. "Junior Drill" has Compo oil-less bearings, safety



switch, 3-jaw chuck and key, spade handle and auxiliary pipe handle. Weight, 10½ lb.

Drill, Penumatic, Type E-50-C

Rotor Air Tool Co., Cleveland, Ohio. (Vol.79,p.677.)

The Type E-50-C pneumatic drill is manufactured in both reversible and non-reversible types and in two speeds. The

450 r.p.m. model is rated at 5/32 in. drilling and 1/16 in. reaming capacity; the 360 r.p.m. model is rated for 1 in. drilling and 1/16 in. reaming capacity.

Flexible-Shaft Tool, "KG Vari-Speed"

Dumore Co., Racine, Wis. (Vol.79,p.906.)

The shaft can be run while bent in a U-shape, permitting the operator to work in "hard to get at" places. An improve-

ment is the speed control by means of an electric governor. The flexible shaft is 43 in. in length. The chuck has a ¼ in. capacity.

Grinder, Abrasive-Band

Walls Sales Corp., 96 Warren St., New York, N. Y. (Vol. 79,p.508.)

The "Hormel-M" is applicable to roughing, smoothing and fine finishing. An eccentric tension device, lever operated, per-

mits quick change of abrasive bands. The table size is 4½x9 in.; belt size, 4x36¼ in.

Grinders, Buffers and Sanders, High-Cycle

Rotor Air Tool Co., Cleveland, Ohio. (Vol.79,p.676.)

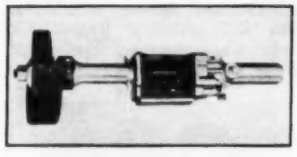
A line of high-cycle electric tools includes the following: 4-, 6-, and 8-in. grinders, 6- and 8-in. buffers, 7- and 9-in. disk sanders, and 6-in. right-angle

grinders. These tools are made in two weight classes, 13 and 15 lb. Improved construction allows space for twelve exceptionally large air channels in the casing to afford proper cooling.

Grinder, Pneumatic, Type D-O-2

Rotor Air Tool Co., Cleveland, Ohio. (Vol.79,p.677.)

The Type D-O-2 6-in. grinder weighs 9 lb., has a twin-rotor



type motor. A four-port governor responds instantly to the load applied.

Grinder, Electric, Hand

Skilsaw, Inc., 3310 Elston Ave., Chicago, Ill. (Vol.79, p.190.)

This compact electric tool is designed for production work, repairing, and die and mold

making. It operates on either a.c. or d.c., delivering 18,000 r.p.m. Weight, 2¼ lb.

Grinder, Electric, Hand

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill. (Vol.79,p.476.)

The deluxe "Hand-ee" grin-

der weighs only 15 oz., though the tool has a speed of 25,000 r.p.m., and ample power to drive a variety of different accessories. Alumilited duralumin is employed in the body of the tool while molded Bakelite parts are used as bearing retainers and for end caps. It is 6 in. in over-all length and 1⅝ in. in diameter.

Grinder, Pneumatic, Hand

Onsrud Machine Works, Inc., 3900 Palmer St., Chicago, Ill. (Vol.79,p.189.)

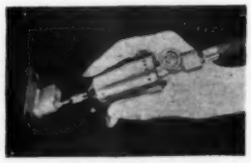
The MD-1 develops ¼ hp. and 50,000 r.p.m. on usual factory air pressure and weighs but 1

lb. 15 oz. The grinder is particularly adaptable for die grinding, milling and internal grinding.

Grinder, Pneumatic, Hand

Monnier Bros., Inc., Algonac, Mich. (Vol.79,p.775.)

A super-speed air grinder, developing approximately 100,000 r.p.m., is constructed of alumi-



num and steel, with the shaft revolving in ball bearings. The device weighs 8½ oz.

Hammer and Twist Drill, "Do-All"

Wodack Electric Tool Corp., 4627 W. Huron St., Chicago, Ill. (Vol.79,p.445.)

By opening the chuck and loosening a capscrew, the ham-

mer member may be removed and the tool used as an electric drill with a capacity of ⅜ in. It may also be used as a portable grinder and buffer.

Nut Runner, Screwdriver and Drill

Buckeye Portable Tool Co., Dayton, Ohio. (Vol.79,p.715.)

The No. 21-S screwdriver is equipped with a positive clutch which can be supplied for reversible operation. Speeds are 500, 750 and 1,000 r.p.m. Ca-

pacity, No. 12 and No. 14 screws.

No. 60-N nut runner has a so-called "shockless" clutch. Speeds are 300, 500 and 750 r.p.m.; capacity, ⅜-, 5/16- and ½-in. nuts.

The No. 51-5400 high-frequency grinder is available in two speeds; 5,400 or 8,500 r.p.m., and uses either 4-in. grinding or buffing wheels.

Sander, Disk, Pneumatic

Rotor Air Tool Co., Cleveland, Ohio. (Vol.79,p.677.)

A disk sander carrying a 9-in. sanding pad and weighing only

10 lb. is designated as the Type B-1. This sander is equipped with a motor of the twin-rotor external-blade type.

Sander, Disk, Electric

Black & Decker Mfg. Co., Towson, Md. (Vol.79,p.707.)

The 7-in. Super-Service sander is for heavy-duty sanding and metal finishing on a

high-speed production basis. Standard voltage is 110 volts. The Junior Drill is available for the following voltages: 32, 110, 220 or 250 volts.

Screwdriver, Electric

Buckeye Portable Tool Co., Dayton, Ohio. (Vol.79,p.506.)

The "Hercules" high-frequency electric screwdriver, designated as No. 21-S, is used principally for screwdriving on

the production line, but with the use of an extra nut socket it may be adapted for light nut running. Capacity: No. 12 and 14 screws, 5/16 and ¼ in. nuts.

Shear, Portable

Stanley Electric Tool Div., Stanley Works, New Britain, Conn. (Vol.79,p.810.)

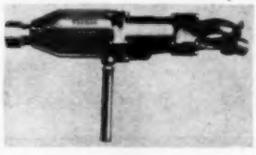
No. 16 "Unishear" is designed primarily for shops doing continuous production work on tough sheet materials to 16-gage hot-rolled steel. The Unishear

cuts straight lines, curves, angles and notches without burr or distortion. The unit weighs 10¼ lb. and is 13½ in. long.

Wrench, Impact, Pott

Ingersoll-Rand Co., 11 Broadway, New York, N. Y. (Vol. 79,p.62.)

The Pott impact wrench employs a rubber "accumulator." Torque from the motor is applied to the accumulator which, in twisting, becomes shortened,



lifting the hammer from engagement with the anvil. The hammer is then released and is spun forward to the next engagement, thus delivering a powerful blow.

Tapping Adapter for Drills

American Machine & Foundry Co., Wahlstrom Tool Division, Brooklyn, N. Y. (Vol.79, p.840.)

Designed for increasing the usefulness of Van Dorn and Black & Decker electric drills,

this adapter eliminates the necessity of a reversible drill, the reversing action being built into the tapping unit. At the slightest backward motion, the tapper reverses. Capacity is ¼-in. in steel.

Trolley Duct

Square D Co., Detroit, Mich. (Vol.79,p.279.)

A system for providing mobile electric circuits for portable tools, so that the work can be followed along conveyors and assembly lines without the use of long, unwieldy and dangerous cords and cables, the "Trolley-Square-Duct" consists of an almost entirely closed duct containing stationary buses, along which travels a carriage or trolley. Collector wheels of the trolley transmit the current by means of wires connected to the tools. Feeders or subfeeders can be brought into the system at any point.

Trolley Duct in use on an automotive assembly line

Balancers, Portable Tool

Independent Pneumatic Tool Co., 600 W. Jackson Blvd., Chicago, Ill. (Vol.79,p.568.)

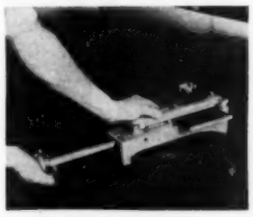
The capacity of Thor balancers for portable tools and other suspended equipment (*AM*—Vol. 74, p. 888) has been increased to 200 lb. Four sizes are equipped with locking and unloading devices.

SMALL TOOLS

Belt Cutter, Alligator

Flexible Steel Lacing Co., 4607-31 Lexington St., Chicago, Ill. (Vol.79,p.605.)

In an 8-in. flat-belt cutting tool the cut is made by pushing the knife through the belt from



one edge to the other. The belt is held by an equalizing clamp.

C-Clamp, Miniature

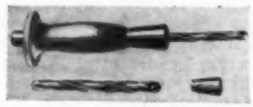
Adjustable Clamp Co., 417 N. Ashland Ave., Chicago, Ill. (Vol.79,p.222.)

"Pony" miniature C-clamps have a 1 in. depth of throat and openings of 1 and 2 in. Frames are made of malleable iron, and the foot is smoothly ground and cadmium plated.

Drills, Hammer, Double-Ended

Brush Nail Expansion Bolt Co., Greenwich, Conn. (Vol. 79,p.222.)

The drills comprise "Double Enders," drills pointed at both



ends, a holder and a collet for each diameter drill. Electric hammer drill chucks are furnished to adapt double enders to all power hammers.

Files, Mill-Tooth

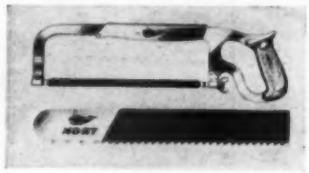
Nicholson File Co., Providence, R. I. (Vol.79,p.249.)

"Superior" brand files have curved teeth so that they shear off metal rather than tear it off. These files are made in rigid and flexible types. The files are made in fifteen designs.

Hacksaw Blades and Frames, "Whale"

Forsberg Mfg. Co., Bridgeport, Conn. (Vol.79,p.474.)

The Whale "Mo-Hy" hacksaw blades are made of Mo-Tung high-speed steel. Hand blades are available in nine sizes, while heavy power blades

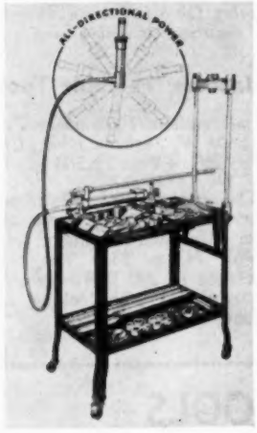


are offered in 30 sizes. Heavy-duty, nickle-plated hacksaw frames have "Lumarith" plastic handles, are adjustable for 8 to 12-in. blades.

Jack, Hydraulic

Blackhawk Mfg. Co., Milwaukee, Wis. (Vol.79,p.347.)

A portable hydraulic jack, known as the "Porto-Power", makes possible many repair jobs ordinarily handled only in specialized shops. Separation of the pump and ram of the jack into two units, connected by a reinforced flexible hose, affords a hydraulic pressure equipment of great flexibility. Seven-ton power may be delivered in any direction by the ram. A group of 30 attachments is provided as standard equipment. The ram plunger travels 6⅛ in.



Saw, Hole

E. C. Atkins & Co., 402 S. Illinois St., Indianapolis, Ind. (Vol.79,p.932.)

A hole saw for cutting holes or plugs of any size from ⅞ to 4½ in. in diameter has the blade replaceable in a permanent saw holder. Alloy steel blades have fourteen teeth per inch.

Marking Tool, Metal

Quality Die Co., South Chicago, Ill. (Vol.79,p.541.)

Of two types of metal-marking devices, one contains all the letters of the alphabet and the numerical digits from 1 to 10 on a single wheel. A single character is impressed at a time.

The second marker is a multiple-wheel device supplied with any number of wheels, and each wheel contains ten, twelve or fourteen characters, either figures or letters, or both.

Stamp, "Numberall"

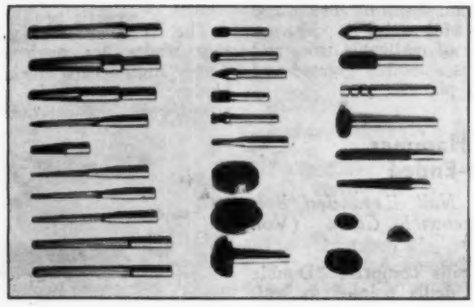
Numberall Stamp & Tool Co., 379 Huguenot Ave., Huguenot Park, Staten Island, N. Y. (Vol.79,p.810.)

Intended for use on all metals, excluding hardened and tempered steels, the numbering stamps have wheels made of hardened tool steel. Setscrew regulates for depth of stamping.

Files, Rotary

Rotary File Co. Stratford, Conn. (Vol.79,p.936.)

The accompanying mill-cut files at the left are suitable for cleaning narrow and deep recesses in aluminum, soft brass and sil.. The center group and the right-hand group show various shapes of hand-cut files and wheels.



Wrench, "Non-Sparking"

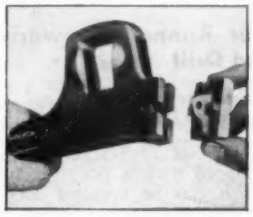
J. H. Williams & Co., 75 Spring St., New York, N. Y. (Vol.79,p.570.)

The "Non-Sparking" open-end safety wrench, is especially adapted for use in industries where great fire hazard exists. The material used in these wrenches is beryllium-copper, drop forged and heat-treated. They are available in both single- and double-head patterns. It is claimed that these wrenches are practically as strong as similar steel wrenches.

Wrench, Pipe

Walworth Co., 60 E. 42nd St., New York, N. Y. (Vol.79,p. 746.)

A renewable lower jaw of hardened steel, with cross tongues seating into cross slots in the handle, is locked in place in this improved pipe wrench so as to eliminate backward shear on its pin and prevent loosening in service.

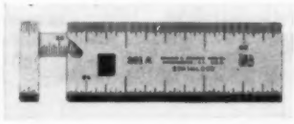


GAGING, MEASURING AND TESTING EQUIPMENT

Caliper Rule, Stainless

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79,p. 931.)

No. 391. A stainless steel caliper rule is made only in 3 in. lengths and is graduated as follows: first corner in 8ths; second corner in 16ths; third corner in 32ds; fourth corner in 64ths. The slide is graduated in 32ds and 64ths.



Camera, Ortho-Stereo

Bausch & Lomb Optical Co., Rochester, N. Y. Vol.79,p.742.)

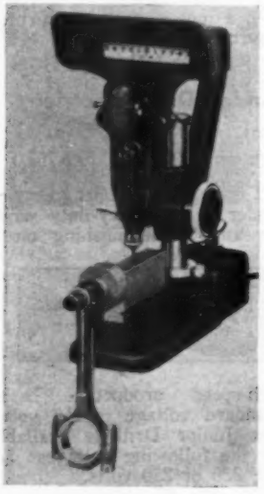
Rendering an object in three dimensional perspective, and supplying the eye with an impression that the ordinary flat photograph cannot achieve, the Ortho-Stereo camera employs the principles of stereoscopy in photography. It will supply pictures that may be observed under the following magnifications: 1X, 1.7X, 3.75X, 6.6X, 11X, and 24X.

Comparators, Nos. 1 and 3

Sheffield Gage Corp., Dayton, Ohio. (Vol.79,p.411.)

The No. 1 "Visual Gage" is both a rapid inspection gage for close-tolerance production work and also a precision comparator. A relative movement of 0.000025 in. between the anvils covers a space of ¼ in. or one unit on the illuminated dial.

The heart of the gage consists of four flat reeds, so arranged that when a part is inserted between the anvils, one



set of reeds is put in compression and the other set in tension. Movement resulting from the equalization of these stresses causes the pointer to move across the reading scale. A diamond tipped upper gaging element minimizes effects of wear. The lower anvil is furnished in two interchangeable types, one flat for the gaging of flat surfaces and outside cylindrical diameters; the other, of a mandrel type, for gaging internal diameters. Maximum head travel is 6 in.

The No. 3 Visual Gage differs from the No. 1 in that it operates on a 1,000-to-1 magnification instead of 5,000-to-1.

Comparator, Model 110

Federal Products Corp., 1144 Eddy St., Providence, R. I. (Vol.79,p.901.)

The Model 95 clear vision indicator is used on the Model 110 clear vision dial comparator. This instrument measures

a half of 1/10,000 of an inch. The indicator is raised and lowered by means of the right-hand knob. The anvil illustrated is standard.

Eyepiece, Grain-Size Measuring

Bausch & Lomb Optical Co., Rochester, N. Y. (Vol.79,p.742.)

For direct reading rather than a mental comparison between the magnified image and a series of standard photomicrographs or charts, the grain-size measuring eyepiece can be employed equally well visually and in photomicrography. To adapt the eyepiece to photomicrography, the eye lens has been fitted in a sliding sleeve.

Eyepiece, Ampliplan

Bausch & Lomb Optical Co., Rochester, N. Y. (Vol.79,p.742.)

Designed to give an unusually flat field, the Ampliplan eyepiece compensates for the curvature of field common to microscope objectives, by means of a negative lens combination. It is intended only for projection or photomicrography. Ampliplans are classified low, medium and high, and should be used with 16 mm., 8 mm., and all high-power dry and oil immersion objectives. Magnifying power is 5X for low, 5.5X for medium, and 6X for high.

Gage Block Set, Johansson, No. 2

Ford Motor Co., Johansson Div., 3674 Schaefer Rd., Dearborn, Mich. (Vol.79,p.715.)

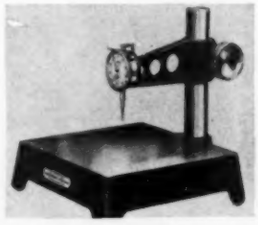
This set of Johansson gage blocks and accessories consists of 35 gage blocks and 4 accessories in a walnut case, which will make 80,000 different inside

and 80,000 different outside gages in consecutive steps of 0.0001 in. steps from 0.300 in. to more than 8.0 in. The accessories include two 0.250-in. jaws and two adjustable holders, sizes 0 to 4.125 in. and 0 to 8.875 in.

Gage, Dial, Upright

B. C. Ames Co., Waltham, Mass. (Vol. 79,p.187.)

Upright dial gage No. 13 has been made to support the dial more rigidly. The cast-iron base with ground top surface

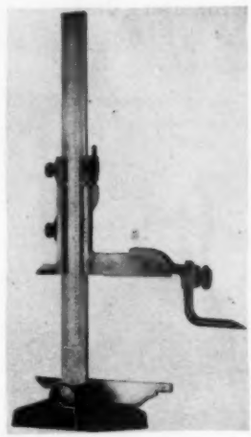


8x8 in. supports an upright steel column that extends 9⅞ in. above the base. Dial is graduated 0-50-0 to indicate thousandths.

Gage, Height, Convertible

George Scherr Co., 128 Lafayette St., New York, N. Y. (Vol.79,p.508.)

This Mauser tool consists of a toolmakers' caliper provided with knife-edge points at the rear of the jaws. For use as a height gage, a lapped base is furnished in which the caliper is located and held by a center-

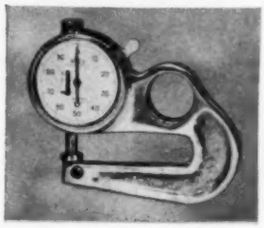


ing clamp screw. Verniers are provided for reading in 0.001 and 1/128 in.

Gage, Dial, Pocket

B. C. Ames Co., Waltham, Mass. (Vol.79,p.250.)

A gage that measures thickness of sheets 2 in. in from the

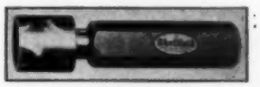


edge has capacity for materials up to ⅞ in. in thickness. The dial is graduated to indicate thousandths.

Gages, Plug, Lapped

Cimatool Co., E. Third St., at June, Detroit, Mich. (Vol. 79,p.712.)

"Sheffield" precision lapped plug gages are made in both straight and tapered styles.

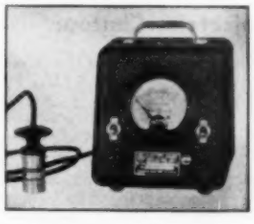


Under a high-powered microscope the fine lapping cuts show equal distribution and crossed paths.

Gage, Thickness

General Electric Co., Schenectady, N. Y. (Vol.79,p.838.)

Permitting quick and convenient measurements of the



thickness of porcelain enamel, paint or other non-magnetic materials which have been applied to or laid on flat sheets or plates of steel or iron, the electric thickness gage weighs only 7½ lb. complete, and can be used portably wherever a 110-volt, 60-cycle power supply is available.

Indicator, Dial Model C-10

Frank E. Randall, 248 Ash St., Waltham, Mass. (Vol.79, p.638.)

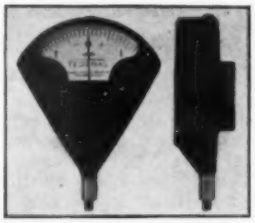
Model C-10 Randall & Stickney indicator is a small, long-range indicator which reads in

ten-thousandths of an inch. It has a range of 0.3 in.

Indicator, Model 866

Federal Products Corp., 1144 Eddy St., Providence, R. I. (Vol.79,p.714.)

In the "Clear Vision" indicator the inspector merely spots the zero point and notices the deviation of the needle. The



dial is limited in scope, there being only twelve graduations representing ten-thousandths, plus or minus, instead of the usual round dial.

Clamp Attachment, Dial-Indicator

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79,p.29.)

Clamp attachment No. 734A is for use with dial test indicators Nos. 730 and 733. This clamp has a maximum capacity of 2¾ in. in diameter and is quickly attached to arbor, spindle or similar machine part.

Indicator, Model 95

Federal Products Corp., 1144 Eddy St., Providence, R. I. (Vol.79,p.837.)

Although the Model 95 "Clear Vision" indicator can be used for laboratory purposes, it is rugged and mechanically

suited for shop use, either production or inspection. The dial has 0.00005 in. graduations and gives both plus and minus indications.

Micrometer Calipers, Nos. 8S and 10S

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79,p. 344.)

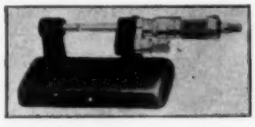
The threads of the measuring screw are ground in a high chromium, high-carbon steel spindle. This steel is also used in the anvil. Stainless steel is

used for the frame, thimble, barrel and all of the unhardened parts. The No. 8S is made to measure 0 to 1 in. by thousandths of an inch. The No. 10S measures 0 to 1 in. by ten-thousandths, as well as thousandths of an inch.

Micrometer Caliper, Bench-Type

Brown & Sharpe Mfg. Co., Providence, R. I. (Vol.79,p. 542.)

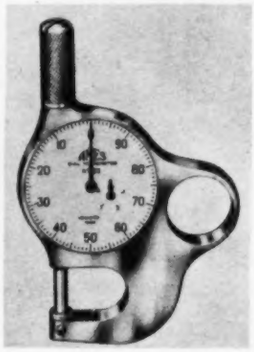
No. 240 RS bench micrometer caliper for inspectors, watchmakers and manufacturing jewelers reads to ten-thousandths of an inch direct by an auxiliary thimble and has a range of measurements of 0 to 1 in.



Micrometer, Dial

B. C. Ames., Waltham, Mass. (Vol.79,p.506.)

Dial micrometer No. 23 is thin and compact for a gage of ½ in. capacity. A small hand



on the dial face indicates the number of large hand revolutions. A knurled barrel at the top is turned to operate the spindle.

Microscope, Electro-Platers

Bausch & Lomb Optical Co., Rochester, N. Y. (Vol.79,p. 742.)

Making it possible for the plater to determine the exact thickness of plating at any desired place, the electro-platers microscope magnifies to such an extent that a plate 0.001 in.

thick appears to be ¼ in. thick. It consists of a monocular microscope stand equipped with both coarse and fine adjustments, an achromatic objective, a Filar micrometer eyepiece, a vertical illuminating unit for lighting the specimen, and a mechanical stage.

Projectors, Contour

Bausch & Lomb Optical Co., Rochester, N. Y. (Vol.79,p. 684.)

The four objectives provided with the large projector give powers of 10, 25, 50 and 100 times, whereas the small instru-

ment uses objectives of 25, 50 and 100 times. All objectives are interchangeable and so adjusted and coordinated that the act of replacing one or the other gives an image of the exact magnification rated on the lens system.

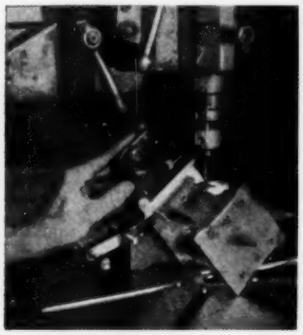
The smaller projector is provided with a vertical translucent screen upon which the outline of an object may be traced, and an opaque horizontal screen, formed by a small retractable drawing board, upon which paper or original drawings may be attached.

Several types of screens are provided with the large projector. It is also equipped with a goniometer chart with a large circular screen inscribed with index lines. The work table moves vertically for focusing or to accommodate objects varying in thickness.

Protractor, Optical

Bausch & Lomb Optical Co., Rochester, N. Y. (Vol.79,p. 803.)

Intended for use in setting up work on jig boring, milling, drilling, grinding, planing and shaping machines, the optical protractor measures angles to one minute of arc. The instru-



ment is built upon an adjustable base, and the ring center revolves, carrying with it a level vial and protractor scale equipped with a vernier scale.

After truing the base, the center ring is revolved by hand, or by micrometer screw, until the required angle appears on the scale. The protractor is then placed upon the work which is turned until the level bubble becomes central.

Stroboscope, "Strobotac"

General Radio Co., 30 State St., Cambridge, Mass. (Vol. 79,p.905.)

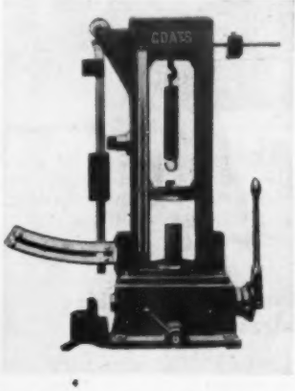
The "Strobotac" measures speed by adjusting the flash rate until the rotating object appears stationary; the flash

rate is then read off of a scale which may be calibrated directly in r.p.m. The Type 631-A has a flashing rate extending from 600 to 12,000 flashes per min.

Testing Machine, Spring, Type RP

Coats Machine Tool Co., 110 W. 40th St., New York, N. Y. (Vol.79,p.937.)

Type RP "Elasticometer" spring testing machine is for loads up to 750 lb. Drive consists of two racks operated by

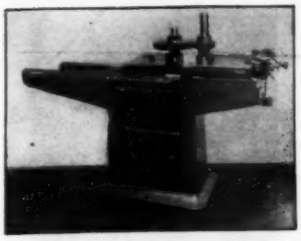


hand lever and pinions. Two models weigh to 500 and 750 lb., respectively. Production, 600 springs per hr.

Testing Machine, Gear, "Parkson"

Geo. Scherr Co., 128 Lafayette St., New York, N. Y. (Vol. 79,p.569.)

The 24- and 36-in. Parkson gear testing jigs are manufactured by J. Parkinson & Son, Shipley, England. Gears are tested in pairs. One arbor is fixed in a carriage which is mounted on slideways on the bed. The other arbor is carried by the floating carriage which has a limited movement longi-

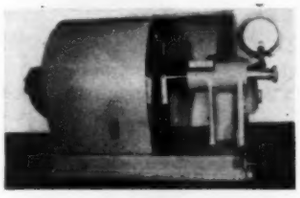


tudinally. A scale is attached to the adjustable carriage, and a vernier to the floating carriage, so that distance between centers may be measured to 0.001 in. Variations of the center distance or movements of the floating carriage caused by defects of the teeth or by eccentricity of the bore may be noted on the dial indicator carried at the end of the jig. A recording device traces a line on the circular chart.

Testing Machine, Torsion Impact

Baldwin-Southwark Corp., Philadelphia, Pa. (Vol.79,p. 379.)

This machine has available at 1,000 r.p.m., 50,000 ft.-lb. of energy, sufficient to test any



known steel specimen in diameters up to 1 in., and many steels up to 1¼ to 1⅜ in. in diameter.

X-Ray Machine, Mobile

General Electric Co., Schenectady, N. Y. (Vol.79,p.808.)

Model KXC-1 is mounted on a truck for inspection of the welds. Exposure time is automatically controlled by a magnetically operated shutter and the machine is capable of producing radiographs of Class 1 pressure vessels in 4-in. rolled steel.

Motive power of the Baker truck upon which this equipment is mounted is used only to carry it the full length of the vessel being examined. The entire equipment and truck are carried from one job to another by means of an overhead crane.

X-Ray Machine, Conveyor-Type

Adrian X-Ray Mfg. Co., 3535 N. Palmer St., Milwaukee, Wis. (Vol.79,p.508.)

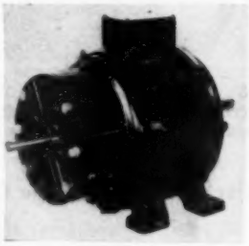
As products pass through the machine on a conveyor belt, the operator looks through an eyepiece to get an interior view of each unit by fluoroscopic means. The machine also has a radiograph attachment for making X-ray photographs.

ELECTRICAL EQUIPMENT

Motor with Magnetic Brake

Electric Specialty Co., Stamford, Conn. (Vol.79,p.219.)

When no electrical power is applied to the motor terminals, calibrated springs press the stationary and rotating disks to-

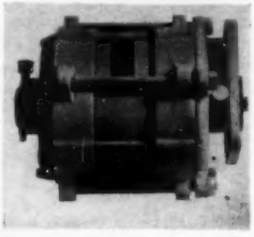


gether. As soon as electrical power is applied to the motor, electromagnets counteract the action of the springs.

Motors, Torque

Electric Specialty Co., Stamford, Conn. (Vol.79,p.220.)

Torque motors for special requirements have been designed for controlling valves, for op-

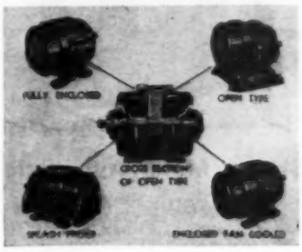


erating water-tight doors, for elevator door operation and many other applications.

Motors, A.C., Convertible

Harnischfeger Corp., W. National Ave., Milwaukee, Wis. (Vol.79,p.221.)

A line of convertible squirrel-cage and split-ring induction motors is offered in all standard frequencies. The feature of these two motors is their ready



convertibility from open type to fan cooled, splash-proof or totally inclosed construction. Ratings, ½ to 125 hp.

Motors, Machine-Tool, Special

Century Electric Co., St. Louis, Mo. (Vol.79,p.679.)

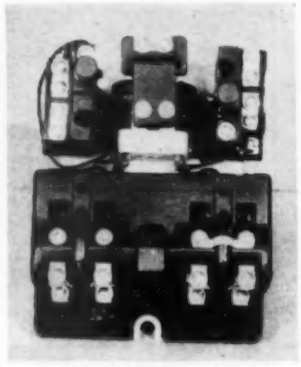
Squirrel-cage, normal-torque and high-torque motors especially designed for such applications as machine tools have special attention to mechanical

stability which has been found essential to the successful operation on this type of application. These motors are available in sleeve or ball-bearing designs and in sizes 600 hp. and smaller.

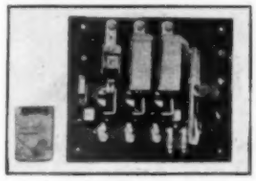
Contactors

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Vol.79,p.713.)

Suitable for machine-tool applications, a line of 15- and 25-amp. contactors confine the arc within the "Deionizing" chamber to permit a compact design for built-in applications. The 100-150 ampere "De-Ion" contactors have high rupturing ca-



15-25 amp. contactor



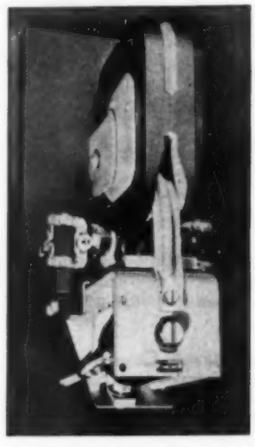
100-150 amp. contactor

pacity which permits long contact life under repeated operation.

Contactors, Heavy-Duty

General Electric Co., Schenectady, N. Y. (Vol.79,p.840.)

For heavy-duty service, where continuous operation is an essential factor CR2800 contactors are equipped with "rocker" bear-

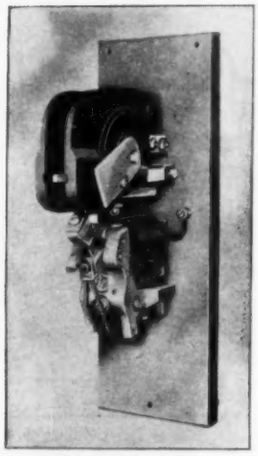


ings which are practically unaffected by wear. All frames are drilled for mounting mechanical and electrical interlocks.

Contactors, Magnetic, "Line-Arc"

Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, Ohio. (Vol.79,p.906.)

For use on mill and crane machinery controllers and other d.c. applications up to and including 800-amp. capacity, these contactors rupture the arc harmlessly in a narrow path or line centered between, but not touching, the arc shields. Operating

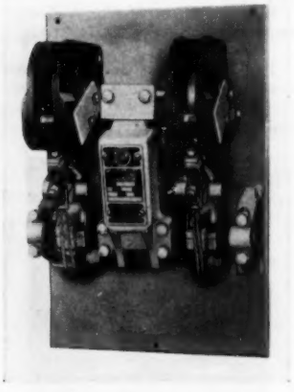


coils are designed for continuous operation on 230 volts.

Contactors, Built-In, 100-300 Amp.

Electric Controller & Mfg. Co., 2698 E. 79th St., Cleveland, Ohio. (Vol.79,p.932.)

Type LTZ "Line-Arc" contactors in 100-, 150- and 300-amp sizes for built-in use are of

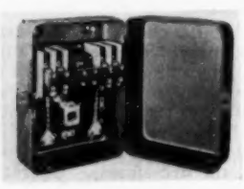


aluminum-alloy construction for high-speed operation. Single-, double- and triple-pole types.

Starter, A.C.

Monitor Controller Co., 51 S. Gay St., Baltimore, Md. (Vol. 79,p.187.)

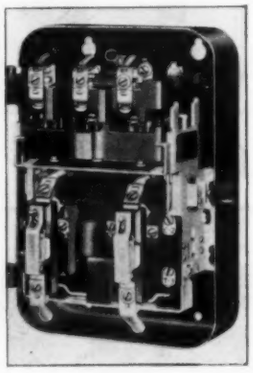
This starter is intended for use with squirrel-cage motors or as a primary contactor for wound-rotor motors in conjunction with suitable secondary rheostats. Standard features: Automatic reset overload; manual reset overload operative from a button in the cover; start and stop push button in the cover.



Starter, Motor

Condit Electrical Mfg. Corp., Boston, Mass. (Vol.79,p.775.)

An across-the-line motor starter for general-purpose installations, Type A-32 is rated 25 hp. at 440 and 550 volts, 15 hp. at 220 volts, and 7½ hp. at 110 volts.



Starter, Motor, Automatic

Lincoln Electric Co., Cleveland, Ohio. (Vol.79,p.809.)

A red stop button extends around and beyond the green start button. Consequently, a bump or fall against the control would move only the stop

button. These starters are furnished in three types for different horsepowers and 110, 220, 440 and 550 volts.

Starter, Motor

Cutler-Hammer, Inc., 429 N. 12th St., Milwaukee, Wis. (Vol. 79,p.602.)

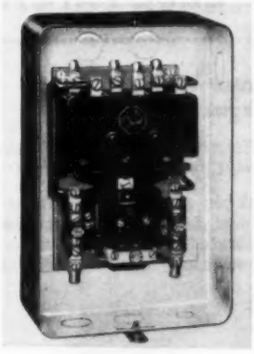
The pushbutton motor starter is adaptable for almost any

fractional-horsepower application, provides protection against overloads. The capacity of the switch may be varied to provide protection for different sizes of motors by changing the heater coil.

Switches, Starting, Solenoid

Allen-Bradley Co., 1311 S. First St., Milwaukee, Wis. (Vol.79,p.62.)

The 50- and 100-amp. sizes will handle polyphase motors up to 15 hp., 120 volts; 30 hp., 220

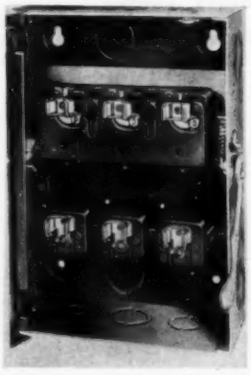


volts, and 50 hp. 440-550 volts. Thermal relays give protection against overloads.

Switches, Safety, Type C

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. (Vol.79, p.446.)

"Colt-Noark" Type C safety switches incorporate the Dual-break switching principle, patterned after the "Quadbreak"

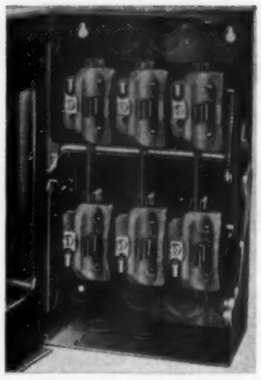


design. A sliding switching member causes each leg of the circuit to be broken at two points instead of one.

Switches, Industrial, Type "A"

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. (Vol.79,p. 475.)

The 575-volt Type "A" switches are equipped with the "Quad-Break" switching mechanism, which provides four current-rupture points in each leg of the circuit, thereby reducing the arcing tendency. The 250-volt Type "A" switches make use of the "Dual-Break" switching mechanism which breaks the circuit at two points in each leg.



Switch, Drum, Type VI

Cutler-Hammer, Inc., 429 N. 12th St., Milwaukee, Wis. (Vol. 79,p.510.)

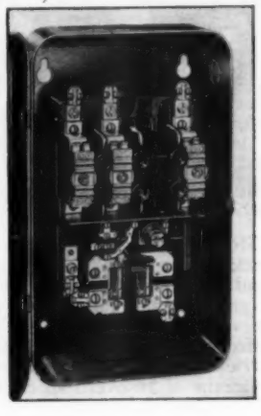
Small size and high capacity rating are features of a drum type reversing switch, as Bulle-

tin 9441, Type VI. It is of the across-the-line type, with "twin-break" contacts and molded arc barriers. Ratings, 1 to 2 hp.

Switches, Type MS

Colt's Patent Fire Arms Mfg. Co., Hartford, Conn. (Vol.79,p. 571.)

Colt-Noark Type "MS" magnetic motor starting switches are made in two styles; local control, up to and including 7½ hp.; remote control, in two sizes, one up to and including 7½ hp., the

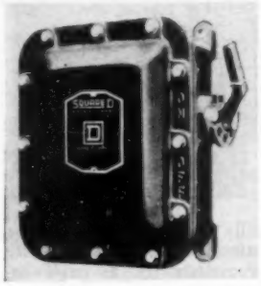


other up to and including 25 hp. Each line is broken at two points, minimizing arcing.

Switches, Explosion-Proof

Square D Co., Switch and Panel Division, Detroit, Mich. (Vol.79,p.935.)

Single-throw and double-throw, not fusible, explosion-proof switches have two pipe-threaded conduit holes at the



bottom, and pads on the sides and at the top for drilling other holes. Two and three poles: 30 to 200 amp., 575 volts a.c. and 600 volts d.c.

Brake, Disk, Style DS

Magnetic Mfg. Co., Milwaukee, Wis. (Vol.79,p.381.)

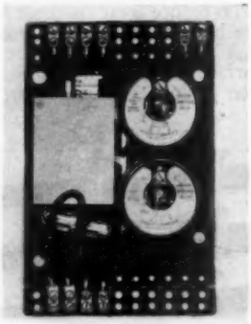
The "Stearns" high-duty Style "DS" disk brake can be made for floor or motor mounting, and can be supplied for

either a.c. or d.c. Five sizes are now in production, ranging from 10- to 90 ft.-lb. torque for continuous operation.

Illumination Controller, "Photronic"

Weston Electrical Instrument Co., Newark, N. J. (Vol.79,p. 476.)

A Photronic "electric-eye" control which turns lights on and off automatically to maintain a pre-determined level of



adequate illumination has a circuit so designed that momentary shadows do not affect the automatic control.

Lamp, Mercury-Vapor

General Electric Vapor Lamp Co., Hoboken, N. J. (Vol.79,p. 189.)

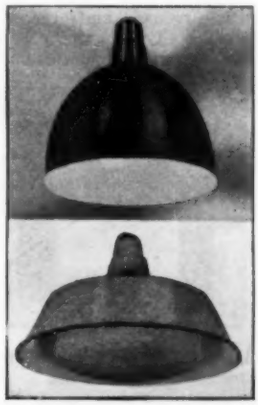
This high-intensity mercury vapor lamp is particularly suitable for high bay lighting. It is an approach to white light which is restful to the eye and enables

quick visual response even to details. The lamp produces 14,000 lumens at a consumption of 400 watts, or approximately 35 lumens per watt. It is made with a Mogul screw base.

Mercury Lamp Mountings

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Vol.79,p.906.)

For industrial lighting using the new 400-watt high intensity mercury lamp, these high, medium and low mounting reflectors of aluminum are suitable



for mounting heights of 18 ft. or more. The new one-piece Glassteel Diffuser is designed for mounting heights of less than 18 ft.

Light Meter

General Electric Co., Nela Park, Cleveland, Ohio. (Vol.79, p.842.)

A light prescribing and measuring device, called the "Light

Meter," is for making illumination appraisals. It is 2¼ in. square and 1¼ in. thick. On the front of the meter is a rectangular-shaped scale with a range from 0 to 75 footcandles. The scale also indicates footcandle ranges for different seeing tasks.

Reflectors, Mercury-Lamp

Miller Co., Meriden, Conn. (Vol.79,p.929.)

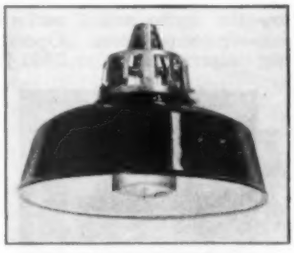
For use with mercury vapor lamps the specially designed reflectors include styles and types for any type of mounting, for practically all industrial locations and for color correction of mercury-vapor illumination by individual or combination equipment. The combination reflectors can be mounted as low as 8 ft. from the floor.

Time Meter, Total-Elapsed

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. (Vol. 79,p.572.)

For totalizing running or idle time on electrically operated machinery, the Total Time Meter registers hours. A registering mechanism having four dials registers 9,999 hours, approximately 400 days, before repeating.

Miller unit for high bays



Low-bay unit

FURNACES AND EQUIPMENT

Furnaces, High-Temperature

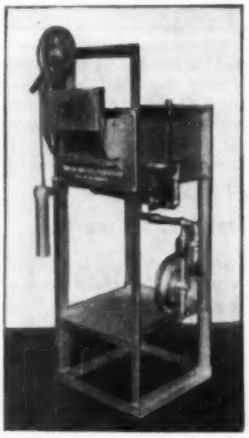
Hevi Duty Electric Co., Milwaukee, Wis. (Vol.79,p.278.)

A line of furnaces operating up to 2,300 deg. F. has been developed through the use of an improved metallic resistor element. The furnace is equipped with the Hayes "gas curtain" atmospheric control feature for providing either oxidizing or reducing atmospheres. The installed capacity is 21 kw. for operation on 230 volts. The furnace will heat from room temperature to 2,300 deg. F. in one hour and 35 min.

Furnace, Toolroom, No. 16-F

American Gas Furnace Co., Elizabeth, N. J. (Vol.79,p.836.)

Low gas consumption of the No. 16-F toolroom oven furnace is due mainly to the new type of insulating refractory lining. A



one-valve control feature gives regulation of the input over the entire operating range, with a turndown ratio of six to one. These furnaces are regularly supplied for operation in the 1,500 F. range.

Furnace, Hardening

Sentry Co., Foxboro, Mass. (Vol.79,p.739.)

This furnace is suited to the Sentry diamond block method of hardening of high speed steel. Heating elements above and below the muffle assure uniform furnace temperatures. Operating temperatures up to 2,500 F.

are available. Terminals and all electrical contacts are shielded. Normal operating consumption is 2¾ to 5½ kilowatts, maximum rating being 10 kilowatts. Furnaces are supplied for use with 110 or 220 volts.

Dilatometer, Model P

Stanley P. Rockwell Co., Hartford, Conn. (Vol.79,p.869.)

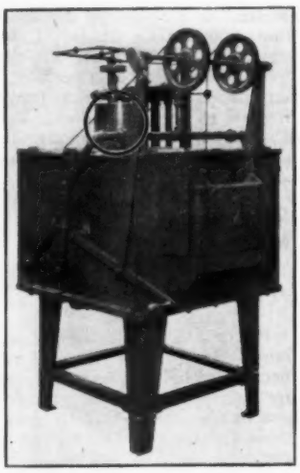
A dilatometer in its simplest form, the Model P instrument consists of a frame, lever and dial with the necessary quartz feeler rod and simple screw adjustment. It is indicating and non-recording. It finds its greatest usefulness as an extra control, insurance and guarantee of

good hardening of tools and dies. It may be used with a great range of existing oven and pit-type tool-hardening furnaces and will indicate precisely the beginning and end of the steel transformation.

Gasifier, Stewart

Chicago Flexible Shaft Co., Stewart Industrial Furnace Division, 5600 Roosevelt Rd., Chicago, Ill. (Vol.79,p.572.)

A gasifier unit, which may be used on any industrial gas-fired furnace, is being offered. Oil is fed through the unit, which

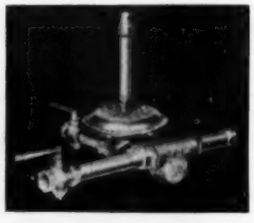


changes it into gas. No change in the present function of the furnace is necessary and the same burners are used.

Mixer, Gas-Air

Philadelphia Drying Machinery Co., 3351 Stockley St., Philadelphia, Pa. (Vol.79,p.539.)

A proportional mixer to maintain constant gas-air ratio in burner applications consists of a diaphragm - actuated control valve known as the "Zero Gov-



ernor," which feeds gas at atmospheric pressure to an inspirator into which the gas is drawn and mixed with air.

Pyrometer Lance, "Hold Heet"

Russell Electric Co., 352 W. Huron St., Chicago, Ill. (Vol.79, p.186.)

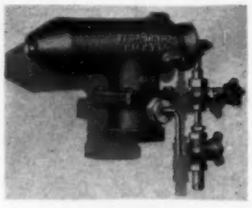
The "Hold Heet" pyrometer lance will serve for checking temperatures in all applications where wall-type pyrometers are used. It may be used as a

"trouble-shooter" and as a check tester in existing pyrometer installations. Heavy rigid thermocouples can be used without a protection tube.

Oil Burner

Philadelphia Drying Machinery Co., 3351 Stockley St., Philadelphia, Pa. (Vol.79,p.60.)

The low-pressure oil burner, is designed to achieve efficient combustion over a wide range of capacities with various grades of fuel. There are nine sizes of

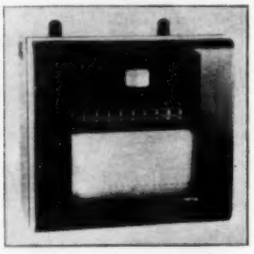


burner ranging from ¾ to 6 in. for pressures ranging from 8 to 32 oz. air pressure and for capacities of ⅛ g.p.h. and upward.

Pyrometer Potentiometer, Wide-Strip

Bristol Co., Waterbury, Conn. (Vol.79,p.808.)

Available in single-record, multiple-record and recorder-controller types, the "Wide-Strip" pyrometer operates on the

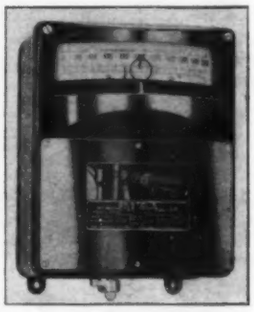


potentiometer principle of temperature measurement. The pyrometer records on a 12-in. chart and is equipped with a 1¼-in. indicating scale that can be easily read at a distance.

Pyrometer Controller

Bristol Co., Waterbury, Conn. (Vol.79,p.805.)

The pyrometer controller is intended for industrial purposes and temperatures up to 3,000 F. It has no open contacts, mercury switches being used. Mechan-



ically operated switches give maintained contacts on multiple-circuit control as well as on single-circuit control. Intermittent contact can be provided.

Pyrometer, Indicating

Thermo Control Devices, Inc., 1112-14 Milwaukee Ave., Chicago, Ill. (Vol.79,p.868)

The Wheelco capacitrol, an indicating control pyrometer, or signal light indicator, is based upon the function that the plate current of an electron tube in oscillating condition is proportional to the amount of grid excitation it receives. This current is used to actuate the sensitive relay containing a mercury tube. Scale ranges of this instrument are 0 to 400-800-1,200-1,600-2,000-2,400 and 3,000 F.

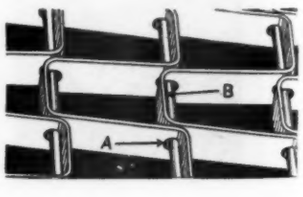
MATERIALS HANDLING EQUIPMENT

Conveyor Belt, Steel-Mesh

Acme Steel Co., 2836 Archer Ave., Chicago, Illinois. (Vol. 79,p.443.)

The improved conveyor belt is especially adapted for conveying products to drying ovens and for sorting and assembling departments. The open mesh allows free circulation of air, heat, water and steam, making it applicable for products that must be washed, cooled or dried.

To reduce wear on these rods, the holes *A* are now elongated to a point where the entire flat surface *B* of the U-shaped section is utilized as a bearing.



Conveyor, Roller, Improved

Logan Co., Louisville, Ky. (Vol.79,p.446.)

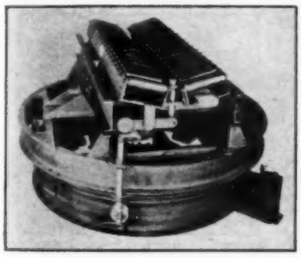
Hexagon shafts prevent rotation of the shaft in the frame and rotation of the bearing race

on the shaft. A retainer ring in each end of the shaft prevents lateral movement.

Conveyor Turntable

Mathews Conveyor Co., Ellwood City, Pa. (Vol.79,p.902.)

A 7-ft. diameter turntable receives steel in 6-ton coils of strip from a straight line of conveyors. The turntable serves

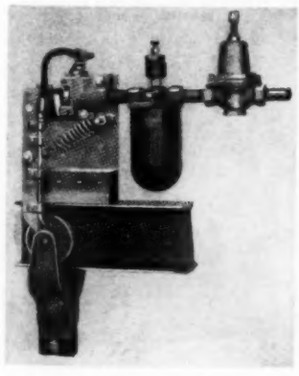


to place the coils of steel with their loose ends in the proper position to enter the continuous pickler.

Lubricator, Conveyor-Trolley

J. N. Fauver Co., Detroit, Mich. (Vol.79,p.442.)

A pneumatic trolley lubricator is offered for conveyors, particularly those that pass through enamel ovens which tend to cake the lubricant, or through washing machines where the lubricant is broken down and washed out. Air passes through

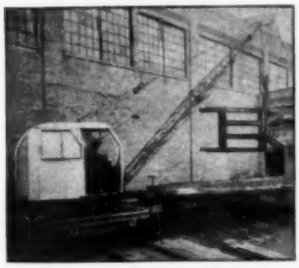


a Norgren air line lubricator which introduces lubricating oil of the proper viscosity a drop at a time. Thus, a fog of oil is applied under pressure to the trolley bearings when the device is tripped by a trolley passing beneath.

Crane, Yard, "Bantam-Weight"

Harnischfeger Corp., Milwaukee, Wis. (Vol.79,p.934.)

P & H Bantam-Weight crane is self-propelling on standard rail wheels and designed for spur handling of materials. The 25-ft. boom will lift 7,730 lb.

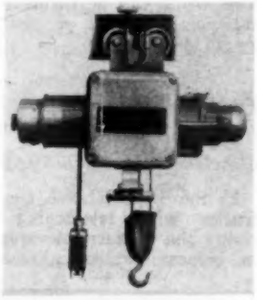


at 10-ft. radius. The crane exerts a drawbar pull of 3,150 lb. and travels at speeds from 1.8 to 6.5 m.p.h. The weight is 21,000 lb.

Control for Cranes and Hoists

Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y. (Vol.79,p.29.)

A selective 5-speed pushbutton controller in which the five speeds are controlled from one button is offered for crane control. The operator, increasing



the pressure of his thumb, feels the change as each of the five independent speeds are obtained. The first speed is a creeping speed, and each of the succeeding four speeds gives a gradual increase in torque.

Crane Stop, Safety-Limit, "Youngstown"

Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland, Ohio. (Vol.79,p.936.)

For use as a safety device in preventing over-hoisting accidents on overhead traveling cranes and other applications,

the improved Youngstown safety limit stop is of the main-motor circuit type. When the limit stop is tripped it also brings the motor to rest quickly.

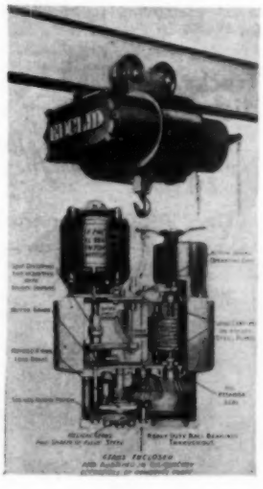
"Grip Lifter"

Shaw-Box Crane & Hoist Co., Inc., Muskegon, Mich. (Vol.79,p.742.)

The "Grip Lifter" is available in two sizes, ½-in. throat, 5-ton capacity, 1¼-in. throat, 10-ton capacity. The Grip Lifter is attached to the crane hoist by a cable connection through the eye on the top.

The grip cannot be released by a pull on the lever with the

load suspended in air, as the pull must exceed the weight of the suspended load. As soon as the load is landed in the desired position, and the weight relieved, a pull on the lever will release it.



Hoist, Electric

Euclid-Armington Corp., Euclid, Ohio. (Vol.79,p.381.)

The helical gears provide a drive that is quiet and smooth in operation. A patented load brake assures safety. A disk brake stops the motor positively.

Hoist, Spur-Gear

Coffing Hoist Co., Danville, Ill. (Vol.79,p.253.)

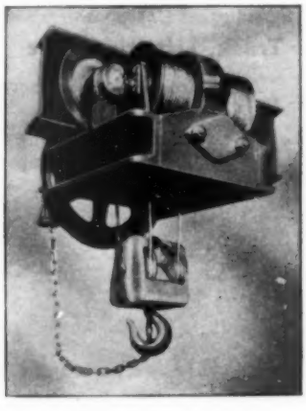
This ball-bearing, spur-gear hoist is made in capacities of ½, 1 and 2 tons. In raising the load this hoist operates like any ordinary chain hoist, but in

lowering the load, a pull on the release rope releases the clutch and the load lowers by gravity. Lowering speed is controlled by a governor.

Hoist, Hand-Operated

Shaw-Box Crane & Hoist Co., Inc., Muskegon, Mich. (Vol.79,p.808.)

Designed to operate where headroom is limited, the Type "WR" hand operated hoist provides an exceptionally high hook lift. It is built in capacities of ½, 1 and 2 tons.



Hoist, "Pul-Lift"

Yale & Towne Mfg. Co., Philadelphia, Pa. (Vol.79, p.714.)

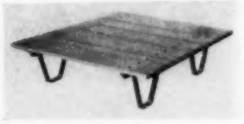
"Pul-Lift" is capable of lifting loads up to 6 tons. A Weston type of self-actuating load brake holds the load firmly

at all times. The lifting mechanism consists of a ratchet and pawl on the smaller capacity models, and a gear reduction on the larger sizes.

Platforms, Skid

Yale & Towne Mfg. Co., Philadelphia, Pa. (Vol.79, p.250.)

One of the features of the "Featherweight" skid platform is the ease with which it is handled. A 36x48 in. platform



weighs less than 40 lb. Legs are welded to the deck angles to assure rigidity.

Tractor, Gas

Mercury Mfg. Co., 4118 S. Halstead St., Chicago, Ill. (Vol. 79,p.343.)

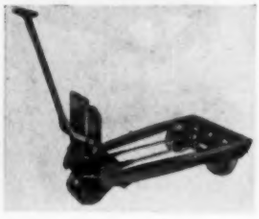
The Type D gas tractor is equipped with large size pneumatic tires, front and rear.

Overall length is 86 in., width, 60 in., and outside turning radius, 115 in.

Truck, Lift, Hydraulic

Lyon Iron Works, Greene, N. Y. (Vol.79,p.310.)

This hydraulic lift truck is made in three standard capacities: namely 3,500 lb., 5,000 lb., and 6,000 lb. The frame is made of angle iron. Timken roller bearings are used in the front wheels to take side thrust when turning, to make steering easier, and to reduce the wear on the wheels. Standard lift is 3 in.



Truck, Hand-Lift

Yale & Towne Mfg. Co., Philadelphia, Pa. (Vol.79, p.252.)

The Zephyr hand-lift truck has been developed for average loads from 300 to 1,000 lb. This truck will handle a 36x42 in.

skid platform in a 4 ft. aisle. A deck will permit the Zephyr to handle loads with or without skid platforms.

Truck, Multiple-Lift

Barrett-Cravens Co., 3255 W. 30th St., Chicago, Ill. (Vol.79, p.381.)

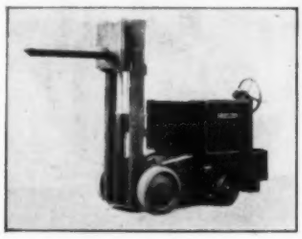
Loads can be lifted with eight short strokes or four full strokes. The "S" model is 18 in. wide and takes platforms

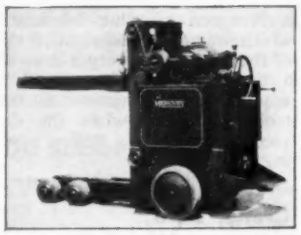
from 36x48 in. to 36x72 in. The "SK" model is 25 in. wide, and takes platforms from 48x54 in. to 48x84 in.

Trucks, Ram and High Lift

Mercury Mfg. Co., 4100 S. Halstead St., Chicago, Ill. (Vol. 79,p.738.)

The "T.T.T." ram truck is



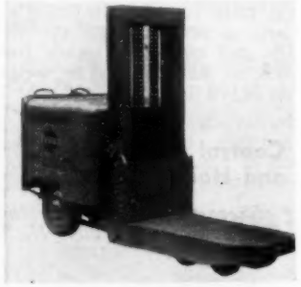


a non-tilting, high lift model with Mercury hydraulic lifting action, equipped with a ram for carrying a 4,500 lb. load. An oversize compartment is provided to accommodate extra battery capacity. The high-lift industrial truck is designed for moving and setting heavy machinery and similar purposes.

Truck, "Hylift", 5-Ton

Baker-Raulang Co., Cleveland, Ohio. (Vol.79,p.711.)

The 5-ton "Hy-Lift" truck has a streamlined appearance which is secured by the elimination of all sharp angles and placing all control and operating



mechanism possible within the battery compartment inclosure. Hoisting is accomplished by two double alloy steel roller chains. This truck can be furnished in any height of lift or platform length desired.

Trucks, Elevator

Elwell-Parker Electric Co., Cleveland, Ohio. (Vol.79,p.903.)

In the Type ELN-6 elevator trucks with telescoping uprights, the platform elevates 62½ in. before inner uprights begin

to rise. Loaded skids may be raised to a height of 10 ft. The truck is 41 in. wide and 128 in. long with a 27x54-in. platform.

Trucks, Electric, Heavy-Duty

Mercury Mfg. Co., 4100 S. Halstead St., Chicago, Ill. (Vol. 79,p.901.)

Although the low-lift industrial truck is built as standard with a compartment to accommodate necessary cells for stor-

age battery operation, the truck is equipped with a gas-electric unit for continuous operation. It has a capacity of 10,000 lb.

Truck, Box, Steel

Stackbin Corp., P. O. 940, Providence, R. I. (Vol.79, p.740.)

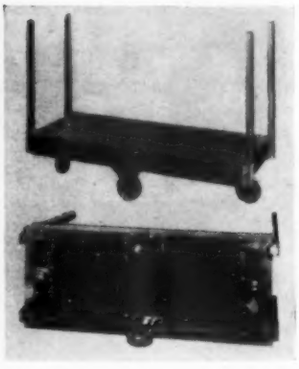
The truck is 33-in. wide, 19-in. long and 23-in. deep, inside dimensions. It is constructed of 20-gage steel, sides and ends.

Bottom is made of 18-gage sheet steel. Heavy gage steel channel is used for the chassis frame.

Truck, Platform, Steel

Stackbin Co., Providence, R. I. (Vol.79,p.446.)

These all - steel platform trucks are constructed of one piece of heavy-gage sheet steel, formed into an inverted box section, with undersides also formed inward and reinforced with 4-in. formed channel struts. The unit is electrically welded. The casters are on the pressed-steel type, welded to the under side.



Truck Caster

Metzgar Co., Grand Rapids, Mich. (Vol.79,p.443.)

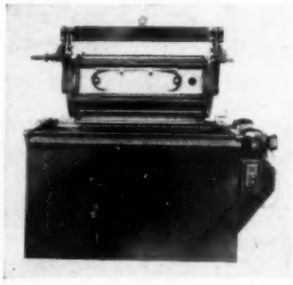
The yoke of the caster, made by the Standard Truck Caster Co., Manistee, Mich., but sold by the above company, is forged as a single unit. Axles are machined from cold-rolled steel. Ball races are closely machined. Diameters, from 2½ to 20 in. are available.

PLATING EQUIPMENT

Plating Barrel

Udylite Co., 1651 E. Grand Blvd., Detroit, Mich. (Vol.79, p.278.)

Steel and shock resistant rubber are used in the construction of this plating barrel. The cylinder consists of a frame work of steel into which are fitted rubber rails and heads. The

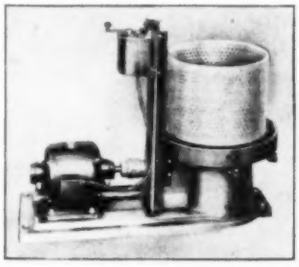


entire steel frame work is anodically charged so that it does not plate. In the Udylite barrel, there is no "treeing." Three danglers on the arbor insure ample supply of current.

Plating Dryer, Centrifugal, "Mercil"

Hanson-VanWinkle-Munning Co., Matawan, N. J. (Vol.79, p.636.)

Available in two dryer shell sizes, 12x12-in. and 18x18-in., the Mercil type centrifugal dryer is adapted for use in conjunction with plating barrels. Pieces to



be dried may be placed directly in the perforated shell or in a separate basket which fits the shell. Floor space, 17x33 in.

Plating Barrel, "Handiplater"

Udylite Co., 1651 E. Grand Blvd., Detroit, Mich. (Vol.79, p.541.)

The "Handiplater" is designed for plating occasional small lots or for production plating of small parts. A detachable cylinder makes possible the use of

any barrel plating solution in the same cylinder. The anodes are held in a small basket suspended from an arm over the bell. Capacity is 25 lb.

Plating Machine, Semi-Automatic

Udylite Co., 1651 E. Grand Blvd., Detroit, Mich. (Vol.79, p.935.)

The work racks are hung on a chain conveyor moving at 1 and 4 ft. per min. The semi-

automatic plating machine is made in a wide variety of sizes. Model shown is 18 ft. long.

Brush, Electroplating

Fernald Mfg. Co., Inc., 72 Cortlandt St., New York, N. Y. (Vol.79,p.510.)

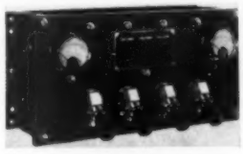
Electroplating by the brush method makes it possible to retouch parts of damaged stock without the necessity of displacing and replacing fixed objects. The anode is contained in the brush bristles so that when the brush is dipped in the electrolyte, conditions obtained

are very similar to tank plating. The brush bristles act as retainers for the electrolyte, and the work itself acts as one of the sides of the tank. A rectifying unit is available to convert a.c. to d.c. which is required in plating operations. A complete line of accessories is handled by the company.

Rheostat for Electroplating

Udylite Co., 1651 E. Grand Blvd., Detroit, Mich. (Vol.79, p.27.)

Close current regulation, sturdiness, compact construction and simplicity of operation are features of the rheostat developed for electroplating processes. The switches are of the self-cleaning, constant-pressure, cam type, and provide good contact at low plating voltages.



TRANSMISSION EQUIPMENT

Speed Reducer, Planetary

Ganschow Gear Co., 1013-15 Washington Blvd., Chicago, Ill. (Vol.79,p.250.)

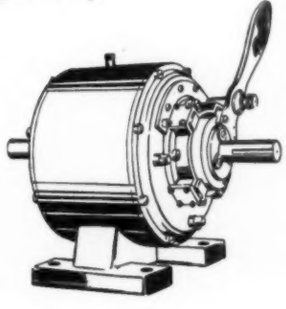
Three types of planetary transmission have been standardized: Type A, direct drive,

Type B, angle drive, Type C, vertical drive. The Type A is shown.

Speed Reducer, Variable

Ganschow Gear Co., 1013-15 Washington Blvd., Chicago, Ill. (Vol.79,p.342.)

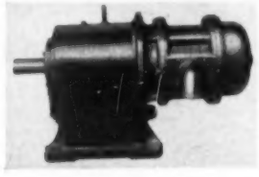
The gears of this variable speed unit, having a positive reduction drive, will not jam when shifting from one ratio to another by means of the cam shifting device. Standard ratios of 4, 5, 6 and 7½ to 1, in sizes from ½ to 25 hp.



Speed Reducers, Motorized

Link-Belt Co., 910 South Michigan Ave., Chicago, Ill. (Vol.79,p.186.)

A standard round-frame motor is secured to the side of the reducer housing. These motorized reducers are available in double reduction for ½

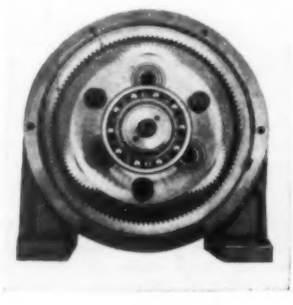


to 75 hp. in ratios up to 38½ to 1, and in triple reduction up to 30 hp. in ratios up to 292 to 1.

Speed Reducers, Plain and Motorized, "S-B"

Sier-Bath Co., 640-50 West 58th St., New York, N. Y. (Vol.79,p.308.)

Speed reducers in plain and motorized types and in horizontal and vertical models are being introduced. Three distinct series of speed reductions are

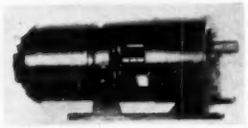


offered: ratios up to 20 to 1 by means of planetary gearing; standard ratios between 20 to 1 and 120 to 1 by the use of the gyrating principle; and a special group with ratios between 120 to 1 and 180 to 1, also by means of the gyrating principle. Sizes from ¼ to 50 hp. are available.

Speed Reducer, "Lectrigear"

Ajax Flexible Coupling Co., Westfield, N. Y. (Vol.79,p.342.)

A helical gear reduction unit called the "Lectrigear," is made in sizes ranging from ⅛ to 2 hp. Standard footless motors are

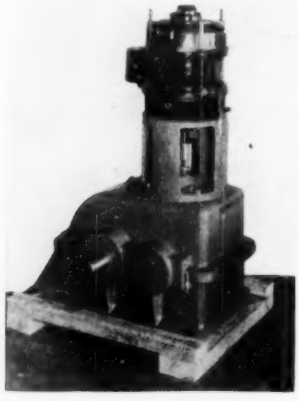


used without any changes in shaft or bearings. Lectrigears can be furnished either with or without motors.

Speed Reducer, Motorized

D. O. James Mfg. Co., 1114 W. Monroe St., Chicago, Ill. (Vol.79,p.934.)

A horizontal speed reducer consisting of a combination of spiral bevel gears and continuous tooth herringbone gears

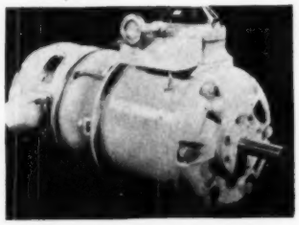


with a motor mounted on top, occupies minimum floor space. Range, 1 to 200 hp.; ratios to 45 to 1.

Transmission, Variable-Speed, "Transitorq"

New Departure Mfg. Co., New Britain, Conn. (Vol.79, p.440.)

Speed changes are obtained by varying the position of three hardened steel rollers in pressure contact with hard steel races. An automatic pressure device keeps the pressure of the rollers on the races proportional to the torque load, utilizing the torque load itself to generate the desired pressure. The de-



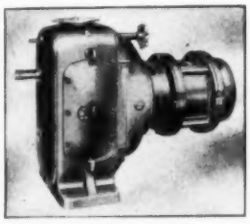
vice is so sensitive that this pressure is maintained whether the load is continuous, variable or shock, which insures positive driving under all conditions, even with extreme overload.

Ratios vary from 6 to 1 to 10 to 1, depending on the size of the unit, giving speeds of from 600 to 3,600 or from 560 to 5,600 r.p.m. with a standard 1,750 r.p.m. The speed is infinitely variable over the range of the unit. A handwheel or remote control is utilized for speed changing.

Transmission, Motorized, "P.I.V."

Link-Belt Co., 910 S. Michigan Ave., Chicago, Ill. (Vol. 79,p.840.)

The transmission can now be furnished in five sizes to 15 hp. and with the following features: Motorized, with motor

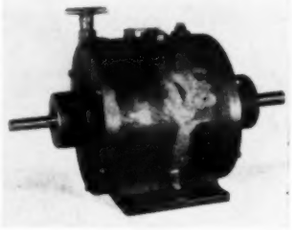


forming an integral part of the unit; with or without speed reduction gearing; with horizontal or vertical box.

Transmission, Variable-Speed

Lenney Machine & Mfg. Co., Warren, Ohio. (Vol.79,p.935.)

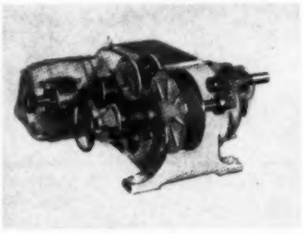
Mounted on the input shaft are cams, which through yokes, connecting links and gear segments, operate three over-running clutches. Three cam movements actuate the three clutch driving collars with each revolution of the input shaft, thus providing a uniform and steady flow of power. The speed is adjustable to a fraction of a revolution per minute by turning the speed control indicator.



Transmission, "Varidrive"

U. S. Electrical Mfg. Co., Los Angeles, Calif. (Vol.79, p.475.)

A geared motor, which offers a speed range from 1 to 10,000 r.p.m. without intricate control mechanisms, consists of a squirrel-cage motor built integral with a variable-speed

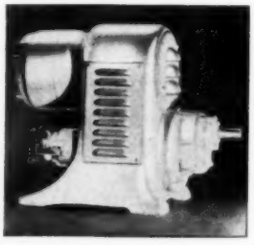


transmission. The latter comprises dual disks coupled with a "Varibelt." Speed changes are obtained by varying the effective diameter of the disks.

Transmission, Upright, "Varidrive"

U. S. Electrical Mfg. Co., Los Angeles, Calif. (Vol.79,p.902.)

The "Varidrive" unit in an upright design saves space, gives the user the option of having the



take-off shaft at either the high or low position.

Transmission Control, Hydraulic

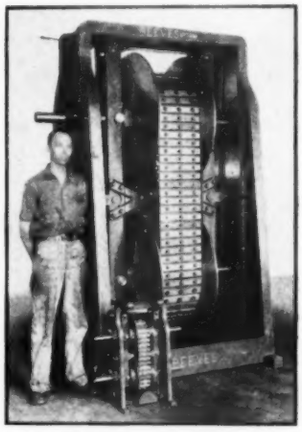
Reeves Pulley Co., Columbus, Ind. (Vol.79,p.685.)

The "Hydraumatic" hydraulic automatic control for its variable-speed transmission was originally developed to meet requirements for a control which would operate from a very light pressure on the indicating lever and would eliminate all "hunting" action. Hydraulic pressure is maintained by a motor driven pump which furnishes oil to a two-way valve. When the indicator lever moves the valve it sends oil to either side of a fluid motor that actuates the transmission as required to increase or decrease its speed.

Transmission, Variable, No. 7

Reeves Pulley Co., Columbus, Ohio. (Vol.79,p.602.)

The largest vertical variable speed transmission ever built, the No. 7 is 8 ft. 2¼ in. high,

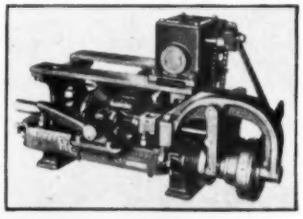


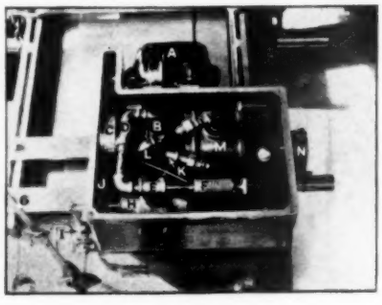
by 5 ft. wide, by 4 ft. 2 in. deep. Diameters of the disks are 39 in., and a V-belt, 12 in. wide and more than 14 ft. long is required. Weight, 5,170 lb.

Transmission Control, Ratchet

Reeves Pulley Co., Columbus, Ind. (Vol.79,p.573.)

For automatic variable-speed regulation through the Reeves variable-speed transmission, a ratchet control was developed. The principle is applicable to any requirement calling for gradual increase or decrease of machine speed over a specified period of time. Increase or decrease in timing of the control is permitted by the adjustable arm.

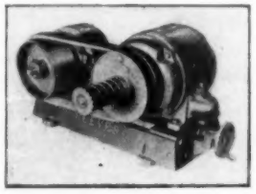




Base, Speed Reducer

Reeves Pulley Co., Columbus, Ohio. (Vol.79,p.601.)

For speed reduction through use of a gear reducer in connection with the "Vari-Speed" motor pulley, a standard mounting for these two units on a common base permits the Vari-



Speed motor pulley to drive directly to the reducer. The gear reducer is placed on a sliding base bolted to the stationary base. It can be adjusted to various positions as required by the size of the reduction wanted.

Belt, Oil-Resisting

L. H. Gilmer Co., Tacony, Philadelphia, Pa. (Vol.79,p.604.)

Either type of belt, V or flat, is practically impervious to the destructive inroads of oil. These belts have run for long periods immersed in oil.

Belt, Cord, Flat

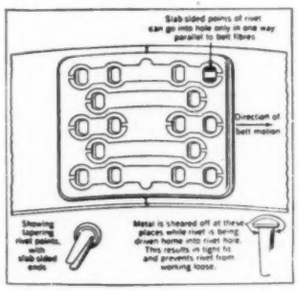
United States Rubber Products, Inc., 1790 Broadway, New York, N. Y. (Vol.79,p.903.)

Due to the cords being imbedded in rubber, the cut edge can be run against shifters. Laminated and cut edge construction permit the use of a single ply of duck on each side instead of several plies in the envelope type. Widths up to 24 in.

Belt Plate

Bristol Co., Waterbury, Conn. (Vol.79,p.931.)

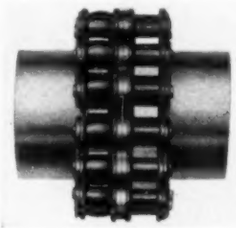
It is impossible to insert the rivet except in one position. In this position the rivet points cut a slot that runs lengthwise with the belt. This method does not impair the lengthwise fibers of the belt, and therefore, does not cut down the strength.



Coupling, Flexible, Chain-Type

Baldwin - Duckworth Chain Corp., Springfield, Mass. (Vol. 79,p.29.)

The flexible chain coupling provides for flexibility without friction and excessive noise. One strand of the chain is equipped with the standard cyl-

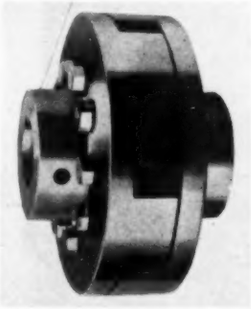


indrical rollers, whereas the other strand has convex-surface, oversize rollers which provide for free operation where shaft deflection and misalignment exist.

Coupling, Flexible, Type B

Lovejoy Tool Works, 4956 W. Lake St., Chicago, Ill. (Vol. 79,p.445.)

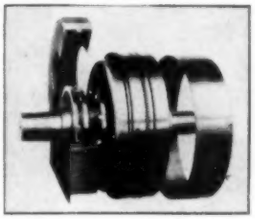
The Type "P" flexible coupling has individual free floating load cushions hung between the jaws on removable studs. There is no wear on the iron or steel jaws, and no lubrication is required.



Coupling, Magnetic-Clutch

Dings Magnetic Separator Co., Milwaukee, Wis. (Vol.79, p.605.)

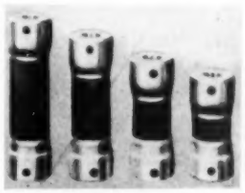
A magnetic clutch coupling insuring positive quick engagement and disengagement has engaging teeth cut at an angle of 60 deg., 3 deg. apart, so that the maximum slippage can never exceed more than 1½ deg. Bronze teeth engage steel teeth.



Coupling, Flexible

Guardian Utilities Co., 1023 E. 46th St., Chicago, Ill. (Vol. 79,p.446.)

This coupling for fractional-horsepower motors is made of flexible rubber, will operate un-

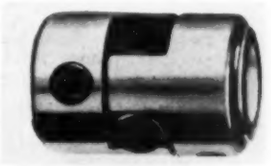


der reasonable lateral or angular misalignment. Lengths from 2½ in. up and with any combination of bores, 5/16, 3/8, 7/16 and ½ in.

Coupling, Flexible

Lovejoy Tool Works, 4956 W. Lake St., Chicago, Ill. (Vol. 79,p.506.)

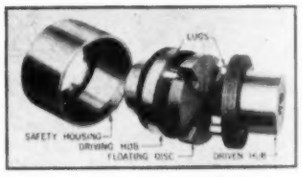
Type "IA" flexible coupling has convex jaw surfaces that exert a rolling pressure when bearing on the resilient spider arms. Bores from ¼ to 3 in., 1/12 to 200 hp.



Coupling, "Lifetyme Uniflex"

Alloy Products Corp., Waukesha, Wis. (Vol.79,p.960.)

The self-aligning coupling consists of four parts. Two of them are driving hubs into whose faces two round lugs are set, two per hub. When assem-

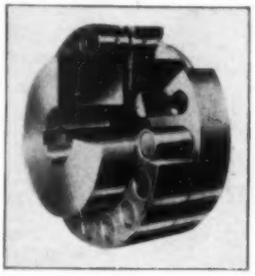


bled the lugs fit into recesses in the periphery of the third part, a drive disk made of bone fiber. The fourth part is a cover housing.

Coupling, Flexible, "Francke"

John Waldron Corp., New Brunswick, N. J. (Vol.79, p.776.)

All coupling flanges, except the larger sizes, are now being made of a forged high manganese alloy steel. Larger sizes are molded of semi-steel. Self-

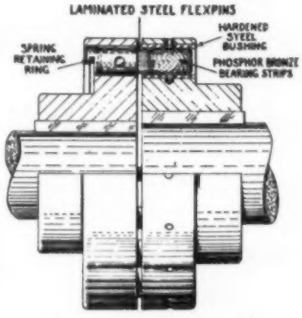


lubricating bronze bushings now replace the old style dry bushings. The center portion of the cross pins, which pass through the perforations in the laminations, is now made glass hard.

Couplings, "Flexpin"

Smith & Serrell, 30 Washington Place, Newark, N. J. (Vol. 79,p.899.)

The couplings consist of steel laminations held in a slotted keeper by hardened steel cross-pins. Sliding ends of the flex-

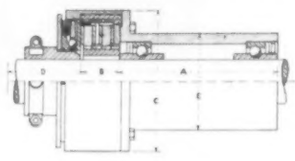


pins have thick phosphor-bronze bearing strips welded to the outside spring laminations. Hardened steel bushings receive the long sliding ends.

Clutch, Disk

Kinney Mfg. Co., 3541 Washington St., Boston, Mass. (Vol. 79,p.443.)

A fully inclosed, single-point-adjusting, disk clutch is made either as a sleeve clutch with several types of sleeve bearings,

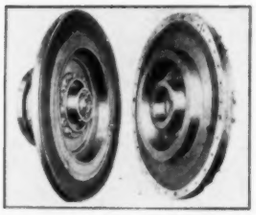


or as a cut-off coupling. Three sizes, single or double disk, with capacities ranging from 1 to 6 hp. per 100 r.p.m. are available.

Clutch, Magnetic

Cutler-Hammer, Inc., 205 N. 12th St., Milwaukee, Wis. (Vol. 79,p.573.)

The method of adjusting the friction faces compensates for wear. The inner circumference of the field ring is threaded and the adjustment is made by ro-

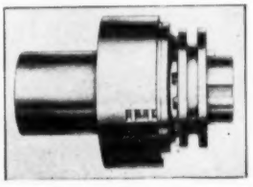


tating the field ring in respect to the magnet field member. The magnet coil may be removed and replaced as a unit.

Clutches, Small

Conway Clutch Co., 1537 Queen City Ave., Cincinnati, Ohio. (Vol.79,p.603.)

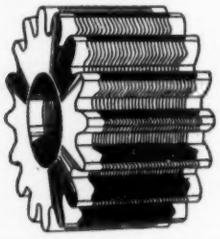
Three sizes have outside diameters of 5⅝ in., 4½ in., and 3⅜ in. respectively. They come in a single plate design for fractional horsepowers, and multiple plates for heavier drives. The clutches can be operated singly or doubly and for forward and reverse drives.



Gear, Laminated

Ganschow Gear Co., 1013-15 Washington Blvd., Chicago, Ill. (Vol.79,p.310.)

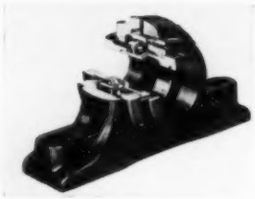
These gears, designed for silent operation, are made up of formed plates which interlock with each other, and which are of "herringbone" construction. Each gear has a built-in oil reservoir which is filled by removing a plug at the side. Tooth pressure on each revolution is distributed to each plate at different intervals. The flexibility absorbs vibrations.



Sheaves, Duro-Brace Texsteel

Allis-Chalmers Mfg. Co., Milwaukee, Wis. (Vol.79,p.929.)

"Duro - Brace" Texsteel sheaves (*AM*-Vol. 74, p. 851) can now be obtained for drives up to 15 hp. Diameters now range from 3 to 18 in. for any number of grooves from two to six.



Pillow Blocks

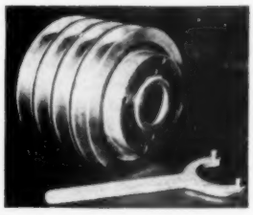
Ahlberg Bearing Co., 321 E. 29th St., Chicago, Ill. (Vol.79, p.713.)

These blocks are available in the so-called unit type for normal and medium duty, and in the ball and socket type for standard and heavy duty. All types are fitted with felt seals to keep out foreign matter.

Pulleys and V-Belts

Dayton Rubber Mfg. Co., Dayton, Ohio. (Vol.79,p.675.)

"Day - Steel" cast - machined pulleys are approximately of the same weight as the pressed steel pulleys. The special semi-steel gives a smooth, close-grained groove surface. Daycoil V-belt has a special casing of synthetic compound to resist oil.



Sheave, V-Belt "Vari-Pitch"

Allis-Chalmers Mfg. Co., Milwaukee, Wis. (Vol.79,p.714.)

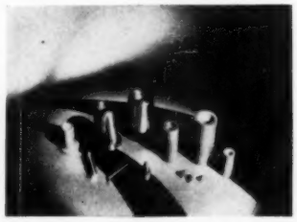
The pitch diameter of this sheave can be changed to give variations in speed as high as 15 to 25 per cent per sheave. If both sheaves of a drive are of this new type, the range of variation can be doubled.

MISCELLANEOUS EQUIPMENT

Blast Nozzles

Norton Co., Worcester, Mass., (Vol.79,p.305.)

These nozzles are guaranteed for 1,500 hours of operation when used with steel abrasive or 750 hours with silica sand. Outside bayonet-type hose fittings are recommended. The liners



are made from "Norbide" boron carbide which is the hardest manufactured abrasive known. This material is also offered for abrasive purposes, wire drawing dies and other wear-resistant applications.

Blueprinter, Floor Model

Milligan & Wright Co., 4611 Prospect Ave., Cleveland, Ohio. (Vol.79,p.574.)

A floor model of the Angstrom lamp blueprinter, having a set-up for the washing and fixing trays and drying boards provided in the base, has a capacity of one 18x24-in. print at a time.

Blueprinter, Table Model

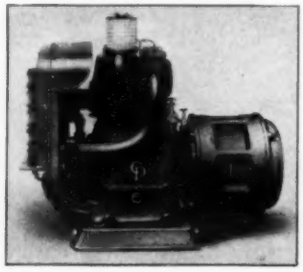
Milligan & Wright Co., 4611 Prospect Ave., Cleveland, Ohio. (Vol.70,p.250.)

The Model 100 is the portable table type which will print one 18x24 in., two 12x18 in., or four 9x12 in. prints at one time.

Compressors, Air-Cooled

Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y. (Vol.79,p.842.)

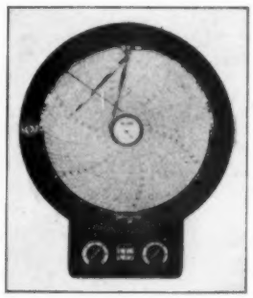
Two-stage, air-cooled compressors are offered in four capacities, 85, 128, 171 and 256 c.f.m. Two air cylinders are used on the two smallest sizes and four on the larger sizes, cast in pairs. An air-cooled, finned intercooler cools the air between the stages.



Controllers, Air-Operated

Brown Instrument Co., Wayne & Roberts Aves., Philadelphia, Pa. (Vol.79,p.605.)

Indicating and recording thermometer-type temperature controllers are available for application between the limits of 40 and



1,200 F. Potentiometer-type controllers are available for temperatures within limits of 300 and 3,400 F.

Cooler, Unit-Type

Modine Mfg. Co., Racine, Wis., (Vol.79,p.604.)

Unit coolers, cold water type, are fitted with a moisture eliminator assembly. Direct expansion coolers have the same scope of application as the cold-water type but have a specially constructed core and are used in connection with a compressor.

Gas and Air Purifier

Alexander Milburn Co., 1416 W. Baltimore St., Baltimore, Md. (Vol.79,p.444.)

A series of perforated plates and strainers removes foreign substances from the air or gas

lines, to insure a moisture-free flow for paint spraying, welding or similar operations.

Barrel Pump, High-Pressure

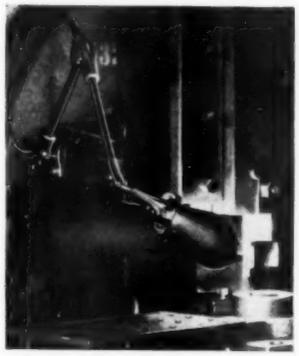
Stewart-Warner Corp. 1826 Diversey Parkway, Chicago, Ill. (Vol.79,p.411.)

The Alemite high pressure, air-operated barrel pump converts any 100 lb. lubricant container into a power gun for industrial lubrication. Lubricant is delivered at the rate of 18 oz. per min., or 6½ oz. of extremely fibrous and heavy lubricants.

Lamps, Machine

Fostoria Pressed Steel Corp., Fostoria, Ohio. (Vol.79,p.308.)

The bracket used on this lamp is equipped with three ball and socket joints, and the light cord is contained in the bracket and



thus presents no problem. The bracket is made of steel tubing and the light shade is made of aluminum.

Slide Rule, Mascot

Tavella Sales Co., 25 Broadway, New York, N. Y. (Vol. 79,p.570.)

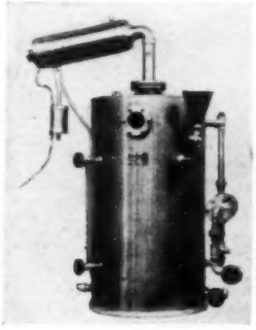
The Mascot slide rule of vest pocket size has scales finely graduated on white celluloid disks 2¾ in. in diameter, the

length of the multiplication-division scale being 6.3 in. Average error of the Mascot slide rule in making rapid calculations is within one-fourth of one per cent.

Still, Solvent-Recovery

Barnstead Still & Sterilizer Co., Forest Hills, Boston, Mass. (Vol.79,p.307.)

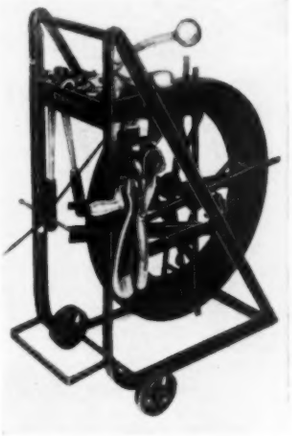
This solvent recovery still is adaptable to the recovery of degreasing solvents. It is available for either continuous or batch operation. It may be heated by steam, gas or electricity.



Reel Stand, Strapping

Stanley Works, Steel Strapping Div., New Britain, Conn. (Vol.79,p.937.)

This reel stand eliminates waste of steel strapping. Only a few seconds are required to

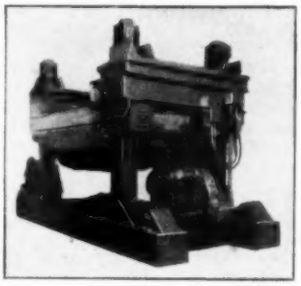


mount a coil. The reel brake is automatic in operation and positive in action.

Table, Drop Pit

Shaw Box Crane & Hoist Co., Inc., Div. of Manning, Maxwell & Moore, Inc., Muskegon, Mich. (Vol.79,p.871.)

The electrically operated drop pit table is constructed entirely by arc welding. The unit is built in both movable and stationary types for removing and replacing locomotive drive wheel



sets, engine and trailer trucks. A feature is the use of four flexible cables and winding drums for raising the load, rather than the former practice of using jack screws.

Table and Engineering Desk, Improved

Hamilton Mfg. Co., Two Rivers, Wis. (Vol.79,p.443.)

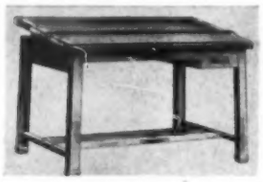
Improvement and simplification of the Auto-Shift drawing and reference table has been announced. The series includes a full-floating, counterbalanced,

adjustable drawing board top. The company has also introduced an engineering desk with a reversible drawing board top which may be tilted to various angles.

Tables, Drafting

Hamilton Mfg. Co., Two Rivers, Wis. (Vol.79,p.278.)

The "Steelwood" drafting tables are being offered in three sizes, with a variety of drawer combinations to meet drafting room requirements. The frame is of welded steel construction.



A new standard height of 37 in. has been incorporated in their construction. Drawing boards are adjustable for slant and equipped with a standard tilting device on each side.

Thermometer, "Tel-Temp"

Ideal Commutator Dresser Co., Sycamore, Ill. (Vol.79,p. 746.)

For quick determination of temperatures in small motors, bearings and machines, the "Ideal Tel-Temp" gives temperature readings from zero to

100 deg. C. It is posible to install the Tel-Temp on machines as a permanent heat indicator or to use it for portable testing.

Valve, Grease Gun

Specialty Sales Service Corp., 138 Holden St., Minneapolis, Minn. (Vol.79,p.186.)

The Triple "S" gun-head control valve operates on any grease line pressure from 50 to 5,000 lb.

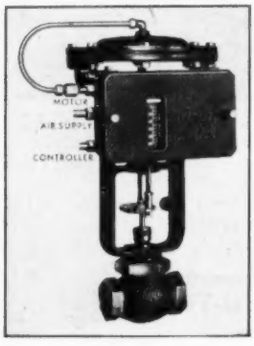
PARTS AND MECHANISMS

The pressure can be stepped up to in excess of 20,000 lb.

Valve Adjuster, "Valv-Precisor"

Taylor Instrument Companies, Rochester, N. Y. (Vol.79,p.904.)

It is claimed that any air-operated controller, with the aid of the "Valv-Precisor," can position the valve disk 50 times more accurately when opposed by

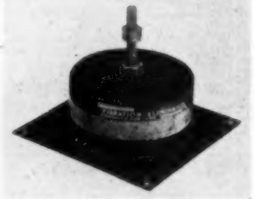


valve stem friction and diaphragm motor hysteresis than when the device is not used. The unit can be mounted on any diaphragm valve.

Vibration Eliminator

Vibration Eliminator Co., 41-26 37th St., Long Island City, L. I., N. Y. (Vol.79,p.455.)

A vibration eliminator consists of a base stamping and supporting housing to which the leg or base of the machine may be rigidly fastened. Eliminators may be supplied for any load between 175 and 375 lb. each.



The isolating material, natural cork, is not affected by water, oil or temperature changes. It does not take a permanent set under excessive loads.

Bearings, Ball, "GreaSeal"

Norma-Hoffmann Bearings Corp., Stamford, Conn. (Vol. 79,p.604.)

"GreaSeal" felt-protected precision ball bearings now include three larger sizes, 40, 45, and 50 millimeter bores.

Bearings, Ball, High-Precision

Fafnir Bearing Co., New Britain, Conn. (Vol.79,p.606.)

Three types of extra precision ball bearings, designed for high speed applications, are of the single-row radial type. "M Type," for light, medium or heavy loads; "WW Type" equipped with a special ma-

chined and ring-piloted bronze retainer, to insure concentricity in operation. "MM Type" bearings, the most accurate series, may be obtained with special composition retainers, to secure lightness.

Bearing, Ball, Cartridge-Type

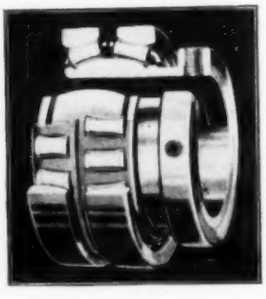
Norma-Hoffmann Bearings Corp., Stamford, Conn. (Vol. 79,p.899.)

Completely inclosed cartridge type, single-row unit, designated as the "3000" series, has inner and outer rings of standard double-row width, but only one row of balls.

Bearing, Roller, Self-Aligning

Link-Belt Co., 307 N. Michigan Ave., Chicago, Ill. (Vol. 79,p.869.)

Ability to carry radial, thrust



and combination radial and thrust loads and inherent self-alignment are the advantages claimed for the Shafer self-aligning roller-bearing "Series 400." Self-alignment is provided by concave rollers between convex outer races and spherical inner race on the sleeve.

Closures, Bearing Housing

Bearing Appliance Co., Ardmore, Pa. (Vol.79,p.409.)

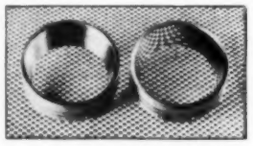
Closures for approximately 150 sizes of ball and tapered-roller bearings are announced. Covers carrying felts, covers with flingers and covers for the

accommodation of standard leather or composition oil seals are included.

"Mirror Finish" for Timken Bearings

Timken Roller Bearing Co., Canton, Ohio. (Vol.79,p.838.)

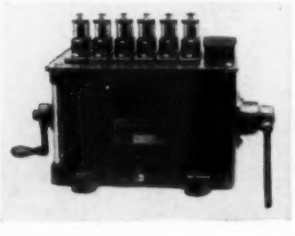
Himken has installed special equipment to produce an improvement in surface finish on its bearings termed "Mirror Finish."



Lubricators, Force-Feed, Model "ET"

Hills-McCanna Co., 2349-59 Nelson St., Chicago, Ill. (Vol. 79,p.27.)

The type "SF" has a positive-



drip sight feed built in on the discharge side. Type "BF" is built without a built-in sight feed. These pumps are intended to be used where delivery is to be checked in the delivery line or at the point requiring lubrication.

Filter, Double-Cased "Purolator"

Motor Improvements, Inc., Newark, N. J. (Vol.79,p.691.)

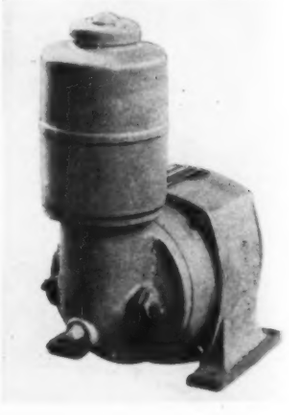
This model, known as D-14JJ, can be provided in series to give two stages of filtration or in parallel to increase volume. These filters range in size

from 7⅛ to 10 in. in width, and from 9 1/16 in. to 11 7/16 in. in depth, and are designed to operate under a maximum working pressure of 100 lb. per sq.in.

Lubricator, Type C

Farval Co., Detroit, Mich. (Vol.79,p.714.)

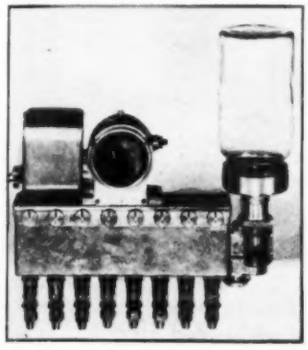
A full automatic system of lubrication for machine tool equipment features a fully inclosed motorized pumping unit. Positive, piston displacement valves of different capacities, located at the bearings, control the delivery of lubricant.



Lubricator, Multiple, Automatic

Gits Bros. Mfg. Co., 1846 Kilbourn Ave., Chicago, Ill. (Vol.79,p.678.)

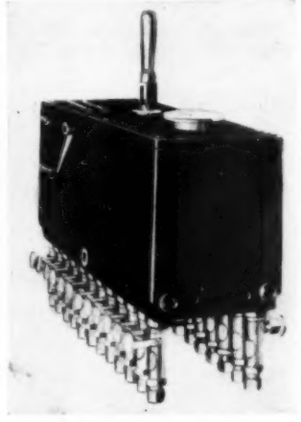
A Telechron operates the electric multiple oiler every 15, 20, 30, or 60 min. Adjustment can be made for one to ten drops. Other means of actuation can be used.



Oil Tank, Sight-Feed

Gits Bros. Mfg. Co., 1846 Kilbourn Ave., Chicago, Ill. (Vol.79,p.678.)

The oil tank with sight drip fittings is available in two sizes. These have 1 to 24 leads and 1 to 12 leads. The main valve



permits shutting off all leads. Sight drip fittings are provided with a locking needle valve to adjust each lead to feed the oil required.

Nuts, Cold-Forged

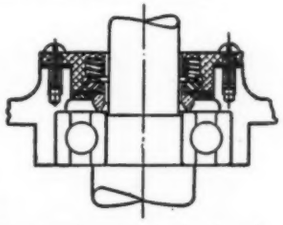
Parker-Kalon Corp., 200 Varick St., New York, N. Y. (Vol. 79,p.737.)

Cap and acorn nuts produced by cold forging have a finish free from tool marks and sufficiently smooth to eliminate the need for polishing before plating. In the stock finish of natural brass, seven blank sizes are available with standard screw thread sizes from No. 6 to $\frac{3}{8}$ in. Plated finishes can be furnished on special order.

Oil Seals

Gits Bros. Mfg. Co., 1859 South Kilbourn Ave., Chicago, Ill. (Vol.79,p.345)

These high-speed seals are listed in sizes from $\frac{1}{4}$ to 4 in. in diameter, by $\frac{1}{16}$ in. increments. Made in two styles, DM with flange, and DP without flange. Construction of

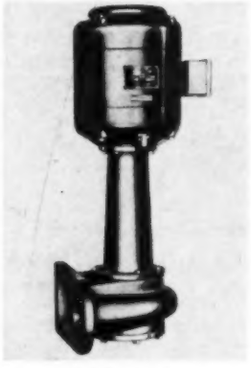


these seals consist of a housing, diaphragm, and seal ring of special bronze. Small compression springs inserted in the housing hold the seal ring in tension with the contacting face of the ball race.

Pump, Coolant, Gusher

Ruthman Machinery Co., Cincinnati, Ohio. (Vol.79,p.281.)

No pipe, hose or tubing need be connected to the Model 11027 pump. The intake supply flows into the pump by gravity to the opening provided in the mounting pad on the side of the machine, and the discharge is transmitted directly into the



base of the machine. The delivery pipe is connected independently to the inside wall of the reservoir, in line with the discharge opening in the pump. Capacity, with a 1-hp., 1,725-r.p.m. motor, is approximately 150 g.p.m.

Screens, Metallic

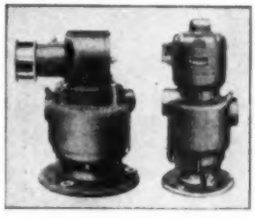
Electrolytic Products Corp., 250 W. 39th St., New York, N. Y. (Vol.79,p.636.)

Fine-mesh metallic screens in any mesh are being produced by electrolytic deposition. Screens as fine as 400 holes per linear inch have been built. A 120-mesh woven-wire cloth ordinarily would have openings of approximately 0.0045 in., yet by this method a 120-mesh screen can be supplied with a hole in excess of 0.006 in. or with a hole of any smaller size, even down to 0.001 in. Smooth surface screens are usually manufactured with a circular hole. Sheet sizes to 20x24 in.

Pump, "Sure Flow"

Acme Machine Products Co, Inc., Muncie, Ind. (Vol.79,p. 571.)

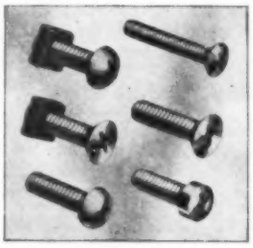
The Acme Sure Flow pump maintains prime without submerging part of the pump. Belt-driven models are available for 4-, 10-, 20-, 50-, and 100-gal. per min.; direct motor-driven models for 10-, 20-, 50-, and 100-gal. per. min.



Screws and Bolts, "Phillips"

American Screw Co., Providence, R. I. (Vol.79,p.903.)

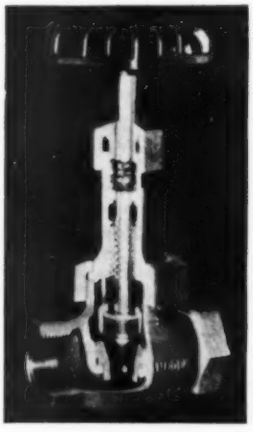
A tapered recess, which exactly fits the taper driver, takes the place of the slot in the conventional screw. Screws hold on to the point of the driver, and may be brought into position with one hand. The self-centering feature prevents the driver from slipping sideways.



Valve, Globe

Hancock Valve Co., 3 Elias St., Bridgeport, Conn. (Vol.79, p.777.)

This globe valve has superhard stainless steel valve disks and seat rings, which prevent wire drawing, steam cutting and galling. Special types of bronze have been developed for the valve stem and bonnet. The design provides tight back seating and permits repacking.



Hydraulic Equipment

Control Panels, Electric-Hydraulic

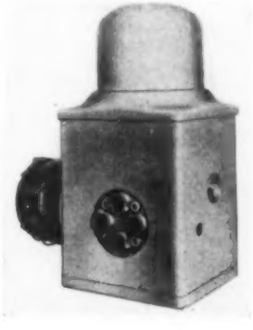
Vickers, Inc., Detroit, Mich. (Vol.79,p.343.)

An electric-hydraulic control panel that will give practically any combination of automatic feeds and rapid traverses has been developed. Starting, reversing and stopping are controlled electrically by pushbuttons or limit switches, relays and solenoids built into the panel. A time-relay provides delayed reverse.

Hydraulic Unit

New Britain-Gridley Machine Co., New Britain, Conn. (Vol. 79,p.645.)

The hydraulic unit is a compact device for hydraulically operating chucks or work fixtures on any type of machine. A constant-speed, fractional-horsepower motor builds up a reserve pressure against an air

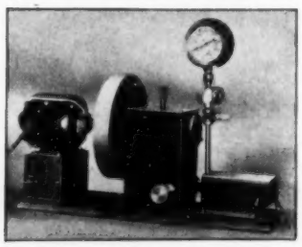


cushion in an accumulator. Chucking pressures range from 50 to 300 lb. per sq.in.

Pump, Hydraulic

Hydro-Motive Co., 1001 W. Washington Blvd., Chicago, Ill. (Vol.79,p.776.)

A direct-connected motor drives a crankshaft and flywheel. The crankshaft reciprocates four pistons, 90 deg. apart, and two spool valves 180

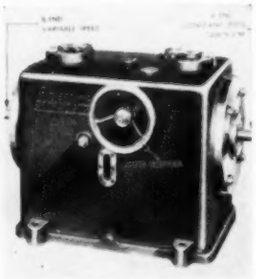


deg. apart. One valve is for idling pressure, the other for line pressure. The model shown pumps 5.6 g.p.m.; maximum working pressure 5,000 lb.

Transmission, Hydraulic Variable-Speed

Vickers, Inc., 1400 Oakman Blvd., Detroit, Mich. (Vol.79, p.509.)

The hydraulic variable-speed transmission permits securing any desired speed between 5 and 750 r.p.m. by turning a handwheel. This varies the stroke and delivery of a multiple-piston pump. Additional adjustments permit speeds up to 2,500 r.p.m. Both the A and B ends can be provided for rotation in either direction. Standard units



have a maximum output of 6 hp. continuous duty at 1,000 lb. per sq.in. pressure, and 7½ hp. at 1,250 lb. per sq.in. on intermittent service.

Valves, Air, Two-Pressure

Ross Operating Valve Co., 6488 Epworth Blvd., Detroit, Mich. (Vol.79,p.441.)

This two-pressure operating valve provides for full line pressure on the work stroke, and selected reduced pressure for the idling stroke.

Center Dope, "TEC"

The Equipment Co., 11246 E. Vernor Highway, Detroit, Mich. (Vol.79,p.870.)

"TEC" center dope is a heat-resisting lubricant for use on lathe centers, grinder centers and milling machine arbor centers. It will not harden.

Chromodizing Process

American Chemical Paint Co., Ambler, Pa. (Vol.79,p.906.)

Rustproofing at low cost is claimed for "Chromodizing," a process adapted to protect any type of steel surface. Chromodizing changes the steel so that the surface currents that induce rusting are stopped. Steel products are dipped in a bath or sprayed with a solution.

Coating for Galvanized Iron

American Chemical Paint Co., Ambler, Pa. (Vol.79,p.871.)

"Lithoform" will make paint stick to galvanized iron and galvanneal. Coating provided will not wash off, it will not chip or corrode and is not affected by baking temperatures.

MATERIALS, PROCESSES AND SUPPLIES

Alloy, "Mallory 3 Metal"

P. R. Mallory & Co., Indianapolis, Ind. (Vol.79,p.604.)

"Mallory 3 Metal" is a material of high electrical conductivity, great mechanical strength and greatly diversified application. It is an alloy consisting predominantly of copper, and is the equal of copper in coefficient of resistivity, coefficient of expansion, modulus of elasticity and corrosion resistance. It has already been used for spot welding tips, flash welding dies and seam welding wheels.

Anodes, "Zam"

Hanson-Van Winkle-Munning Co., Matawan, N. J. (Vol. 79,p.376.)

An anode named "ZAM" (zinc, aluminum, mercury), is not attacked by either acid or cyanide solutions until the current is applied, making it possible to have an anode free from sludge, and one which can be completely used in zinc solutions.

Anodes, Ball-Type

Udylite Co., Detroit, Mich. (Vol.79,p.870.)

Ball-type anodes (*AM*—Vol. 76, page 1081) are now available for copper, brass and zinc plating. The ball anode eliminates scrap losses.

Anode Filter Bags

Hanson-Van Winkle-Munning Co. (Vol.79,p.902.)

Filter bags for anodes consist of two cloth bags, one fitting inside of the other, with a layer of filter paper between. Sludge, which may cause rough and pitted deposits, remains in the bag.

Bar Stock, Stainless-Steel

Jessop Steel Co., Washington, Pa. (Vol.79,p.777.)

Developed for use in applications where the surface of the bar must have corrosion and temperature-resistant properties, "Silverbond" stainless steel bar stock, has a web-like structure of which low carbon inexpensive inserts make up approximately 40 per cent. These inserts are mechanically held, as well as welded by pressure applied at high temperatures.

Brazing Flux

Handy & Harman, 82 Fulton St., New York, N. Y. (Vol.79, p.346.)

"Handy Flux," is intended for brazing steel, monel metal, nickel, beryllium-copper, and various other ferrous and nonferrous metals and alloys. It is fluid at 1,200 F., permitting the use of brazing alloys and silver solders with low flow points.

Bright Zinc Process

E. I. du Pont de Nemours & Co., Wilmington, Del. (Vol.79, p.810.)

An electro-plating process, which deposits a bright zinc surface on steel articles, was developed to meet the need for an economical method of making steel rust-proof and of bright appearance.

Cement, Acid-Proof

Technical Products Co., Pittsburgh, Pa. (Vol.79,p.220.)

Sauer-Eisen No. 21 acid-proof cement is a white powder of high silica content which, after mixing with water, hardens by chemical action into a strong porcelain-like structure. This cement will adhere to practically any solid substance, and can be used in pickling tanks.

Cement, Insulating

George F. Pettinos, Inc., 1206 Locust St., Philadelphia, Pa. (Vol.79,p.412.)

Sonittep insulating cement will adhere to hot or cold surfaces of practically any texture or material without reinforcement. It will withstand temperatures up to 2,000 F. without peeling. Applications of this cement include various types of furnaces, ovens and boilers.

Coatings for Metal

Technical Coatings, Inc., 11 Park Place, New York, N. Y. (Vol.79,p.872.)

Described as a combination of pure vegetable gums and heat-treated oils, the line of coatings is said to form films which are free from porosity and impervious to water and corrosive atmospheric gases. Drying time varies from 4 to 15 hrs.

Covering, Plating-Rack

Hanson-Van Winkle-Munning Co., Matawan, N. J. (Vol. 79,p.637.)

Kote-Rax, a corrosion-resisting coating for plating racks, is applied by dipping. The tough, rubber-like film possesses high dielectric resistance and capable of withstanding considerable mechanical abuse.

Die-Casting Alloy, "Doler-Brass"

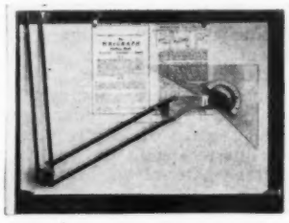
Doehler Die Casting Co., 386 Fourth Ave., New York, N. Y. (Vol.79,p.773.)

"The Doler-Brass" contains copper, zinc and silicon. Tensile strength, 65,000 to 75,000 lb. per sq.in.; yield point 30,000 to 40,000 lb. per sq.in.; elongation, 20-25 per cent in 2 in.; reduction in area, 20-25 per cent.; Brinell hardness, 110-120.

Drafting Blocks, "Wrigraph"

L. G. Wright Co., 5713 Euclid Ave., Cleveland, Ohio. (Vol.79,p.187.)

Combining a drawing board and a drafting machine, this instrument is made in three sizes. The board is made of ¾ in. black Presdwood and is equipped



with clips which hold either a single sheet or a pad of paper. Interchangeable attachments are available for the parallel device.

Enamel, Porcelain, for Cast Iron

Porcelain Enamel & Mfg. Co., Baltimore, Md. (Vol.79, p.602.)

Lead-free cast-iron enamels, which are a match in whiteness for sheet-iron enamels, are more workable than the old lead-bearing types, as they require no special treatment.

Felt-Bonded Metal

Felters Co., Boston, Mass. (Vol.79,p.446.)

Felt-bonded metal, offered jointly by H. H. Roberts & Co., Pittsburgh, Pa., and the above concern, is manufactured by a method which produces a

permanent bond between felt and metal. The material has advantages for sound deadening, vibration absorption, heat and cold insulation. Felt in various thicknesses and weights can be applied to either or both sides of the metal.

Layout Fluid

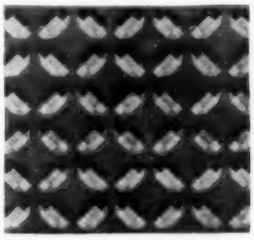
Dayton Rogers Mfg. Co., 1835 E. Franklin Ave., Minneapolis, Minn. (Vol.79,p.476.)

"Layout Fluid" for preparing tool and die blank surfaces for layout, has an advantage over the old copper sulphate method, because the scribed lines have a pronounced contrast against the dark background.

Floor Plate, Multi-Grip

Illinois Steel Co., 208 S. LaSalle St., Chicago, Ill. (Vol. 79,p.277.)

The design of the "Multi-Grip" floor plate has been developed to assure high degree of skid resistance from every angle. A feature of the plate is its comfort under foot. All lugs have a flattened top surface.



Paint, Luminescent, "Dialux"

Grobet File Corp. of America, 3 Park Place, New York, N. Y. (Vol.79,p.220.)

"Dialux" luminescent paint has the quality of glowing in the dark after having been exposed to light. The luminosity lasts for 12 hours. Dialux does not contain any radio-active matter, and is not inflammable nor toxic.

Paint, "Plicote"

Watson-Standard Co., 225 Galveston Ave., Pittsburgh, Pa. (Vol.79,p.636.)

Plicote has shown great resistance to chemicals. Tanks coated with it have withstood the action of 50 per cent caustic solutions at elevated temperatures. Brine tanks have also been successfully coated.

Paint Stick, "Markal"

Helmer & Staley, 2475 South Parkway, Chicago, Ill. (Vol.79, p.938.)

"Markal" paint stick, paint in stick form, is made in two types; one for cold marking and the other for hot marking. It dries and remains as permanent as any other paint.

Papers and Cloths, Blue-Print

C. F. Pease Co., 813-821 Franklin St., Chicago, Ill. (Vol. 79,p.61.)

For blue-prints and blue-line prints that will not "bleed", "K" speed paper or cloth may be fully exposed, even over-exposed, and still produce a deep blue and permit the whites to stand out clearly. These papers and cloths are available in all standard widths, weights and rag content, and in rolls.

Sketch Paper, Isometric

Wade Instrument Co., 2274 Brooklyn Station, Cleveland, Ohio. (Vol.79,p.509.)

The improved isometric sketch paper is designed for making quickly three-dimension scale drawings. All axes are spaced 1 in. apart and have ¼ in. subdivisions. A double-line Y shows the center and isometric principle.

Rubber Coating

Kelsan Products, St. Clair, Mich. (Vol.79,p.410.)

Parts can be sprayed, brushed or dipped in Kelsanite, thereby sealing the surface against air and moisture. As a rust pre-

ventor in storage of metal parts, Kelsanite coated parts have been subjected to over 150 hr. salt-spray tests without showing any signs of corrosion.

Rubber Compounds

Self-Vulcanizing Rubber Co., 605 W. Washington Blvd., Chicago, Ill. (Vol.79,p.873.)

"Selfvulc" can be easily and quickly applied to equipment of all kinds. Selfvulc in either plastic or liquid form can be applied cold. It cures itself by exposure to the air without the aid of heat or pressure. In the liquid form, it is brushed, dipped or sprayed like paint.

Rust-Proofing Process, "Spra-Bonderizing"

Parker Rust-Proof Co., Detroit, Mich. (Vol.79,p.410.)

Supplementing the immersion "Bonderizing" process, "Spra-Bonderizing," chemically produces a rust-resistant phosphate coating that provides an adherent base for paint, enamel or lacquer. Processing time has been reduced to 60 sec. as against 2 to 5 min. by the immersion process.

Goggle, Hot Workers

American Optical Co., Southbridge, Mass. (Vol.79,p.186.)

The "Duralite-50" hot work-

ers' goggle is intended for use in confined spaces or where the humidity is high. This goggle practically doubles the area usually allowed for ventilation.

Goggle, "Ful-Vue"

American Optical Co., Southbridge, Mass. (Vol.79,p.841.)

Advantages of F3100, "Ful-Vue" goggle are its appearance and its comfort, features which are expected to make it easier to enforce goggle programs.

For the customary nose-piece, the goggle substitutes pearl full-rocking nose-pads. Comfortable fitting is made possible. The Ful-Vue goggle is fitted with the new 6-curve, Super Armorplate lenses.

Goggle, Wide-Vision, No. 220

Chicago Eye Shield Co., 2298 Warren Blvd., Chicago, Ill. (Vol.79,p.902.)

The super-safety lens used in the "Cesco" Style No. 220 wide-vision goggle does not change

direction of light rays passing through the lens. The shape of the eye cups allow natural, full and wide vision.

Lens, 6-Curve Super Armorplate

American Optical Co., Southbridge, Mass. (Vol.79,p.931.)

A goggle lens having far greater impact resistance than previously used in standard eye-protection equipment is called

the "6-Curve Super Armorplate." It obtains extra strength from its high curvature.

Steel, Molybdenum High-Speed, "Mo-Max"

Cleveland Twist Drill Co., Cleveland, Ohio. (Vol.79,p. 346.)

Several lines of molybdenum high-speed steel are appearing on the market. These steels might be classified under the general name "Mo-Max," meaning a composition in which molybdenum is the principal alloying element. From this generic title there have been developed such trade names as "MoTung," which designates the material offered by the Universal Steel Company, Bridgeville, Pa., and the Cyclops Steel Company, Titusville, Pa. The former company was active in developing such material but found that Joseph V. Emmons of the Cleveland Twist Drill Company had an earlier patent.

Other companies that are producing varieties of "Mo-Max" steel under similar license agreements with the Cleveland Twist Drill Company are as follows: Ludlum Steel Company, Watervliet, N. Y.; Crucible Steel Company, New York, N. Y.; Braeburn Steel Company, Braeburn, Pa.; Latrobe Steel Company, Latrobe, Pa.; Jessop Steel Company, Washington, Pa.; Halcomb Steel Company, Syracuse, N. Y.; Vulcan Crucible Steel Company, Aliquippa, Pa.

The composition of MoTung steel is as follows:

Carbon	To suit application
Molybdenum	7.50 to 8.50%
Tungsten	1.25 to 2.00%
Chromium	3.50 to 4.50%
Vanadium	0.90 to 1.50%
Manganese	0.20 to 0.40%
Silicon	0.25 to 0.50%

As compared with tungsten high-speed steel of the usual 18-4-1 analysis, the MoTung steel has the following advantages: (1) easier to machine, (2) lower temperatures for heat-treatment, (3) tougher, (4) more economical, (5) stable in price and supply, and (6) performance equal to or better than 18-4-1. The relative densities of MoTung and tungsten high-speed steel are 8.7 and 7.95, indicating that the 18-4-1 analysis is practically 10 per cent heavier.

Steel, High-Speed, Mogul

Jessop Steel Co., Washington, Pa. (Vol.79,p.902.)

Under a license agreement with the Cleveland Twist Drill Co., Cleveland, Ohio, holder of a patent covering "Mo-Max" molybdenum high-speed steel, the above company is producing the same type of steel under the trade name of "Mogul."

Steels, Alloy, Free-Machining SAE

Carpenter Steel Co., Reading, Pa. (Vol.79,p.638.)

It is claimed that selenium is superior to sulphur as a free machining element in two important particulars. First, a given percentage of selenium does not produce as much slag-like material. Second, selenium is more potent in its free-machining effects. These two advantages combine to produce a steel which is very much cleaner and more uniform than would be a higher sulphur steel. The presence of selenium does not interfere with the response of the material to heat-treatment.

The experimental work described in the patents covering this metal is extremely comprehensive, covering practically all S.A.E. types of analyses, both in the low carbon carburizing grades and in the higher carbon tempering grades.

Lacquer, Stop-Off

United Chromium, Inc., 51 E. 42nd St., New York, N. Y. (Vol.79,p.737.)

A stop-off lacquer, "Unichrome Resist" for use in chromium plating possesses the following properties: it is an electrical insulator, resistant to chemical action, flows readily, air-drys quickly, has good adhesive properties, is readily removable by means of a solvent and readily applicable either by brushing, spraying or dipping, as desired. When in contact with the chromium plating solution, the lacquer does not yield any contaminating products.

Molding Material, Black

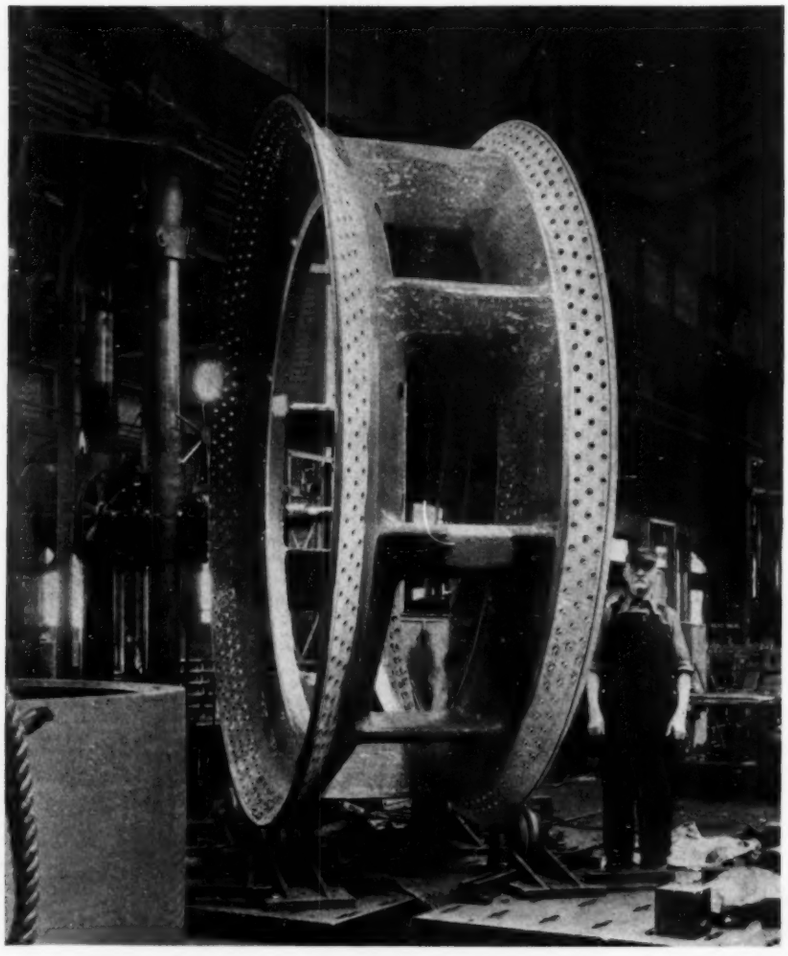
General Plastics, Inc., N. Tonawanda, N. Y. (Vol. 79, p.539.)

No. 2260 K black Durez phenolic molding material is for larger moldings of the deluxe type. Impact strength of the material is approximately one-third greater than the general run of phenolic molding compounds. It has a compressive strength of 29,000 lb. per sq.in.

Oils, Cutting

E. F. Houghton & Co., Philadelphia, Pa. (Vol.79,p.344.)

This oil is fluid so that it will penetrate quickly back of the cutting edge of the tool, and has high strength to withstand extreme pressure exerted on the tool. These qualities are built into the straight cutting oils now available, including Super Refrigerant Base and "Frapol" No. 414 and No. 418.



***A Long Job*—Nearly 700 holes had to be drilled in this cast-steel speed ring for and 18,000-hp. Allis-Chalmers hydraulic turbine so that the plate steel speed casing could be riveted to it. This ring is for one of the two turbines going into the Platte Valley Public Power and Irrigation project now being installed at North Platte, Nebraska**

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Watching Washington

Al Smith threatens to "take a walk" . . . Nye probe peters out when Senator tries to fix blame on Wilson . . . 48 AAA's planned where only one grew before . . . Reciprocal Trade Act questioned

WASHINGTON—"We can either take on the mantle of hypocrisy or we can take a walk, and we will probably do the latter." What does "take a walk" mean? Does it mean that Al Smith will lead a bolt of conservative Democrats? Or does it mean merely, as Administration interpreters would have us believe, that the former New York governor will refuse to lend his support if representatives of the Democratic party indorse the Administration?

Hearers of the Liberty League broadcast will be inclined to conclude that the milder view of Al Smith's speech is the result of wishful thinking; that his words were too much akin to a declaration of war on the New Deal to herald retirement to the side lines should the Philadelphia convention confirm Rooseveltian policies.

At any rate the cryptic phase of the Smith speech is a good attention getter; "take a walk" may eventually win a place alongside of "do not choose" as a prime political enigma. One thing is clear—that the conservative Democratic stand is defined and out to beat the New Deal at Philadelphia, or later. All of which may have marked effect on political history.

Nye Denied

In his Senate Munitions Committee, Senator Nye had a perfect political set-up. Popular opinion was quite willing to accept his premise that wars were financial promotions. Spotlight and headlights were assured, with partners of the House of Morgan to be put through their paces. Truly the Senator's big moment. All he needed was a modicum of evidence to establish himself as No. 1 demagogic delver.

But somewhere something went sour. Mr. Morgan and his international bankers showed that most of the startling revelations had appeared in public print during war and prewar years. So forthright and convincing were their statements that the Senator was glad to get them off the stand. In short, the investigation proved a fizzle.

Then Nye made a tactical error. To make his case against the bankers hold water he sought to demonstrate that Woodrow Wilson was putty in Morgan's hands.

Thousands of Wilson worshipers throughout the country cried out in protest against this besmirching of their dead idol's name. Led by Senator Glass, Wilson supporters rushed in, threatened to scuttle continuation of the Nye investigation, muddled up neutrality legislation.

Probable Neutrality Law

Senatorial tempers were not made sweeter by Father Coughlin's offer to finance the inquiry himself. Even those who privately agreed with Nye in his move to put the White House and State Department in a straitjacket at the start of hostilities may now find it difficult to lend him support. Probability is that the law eventually passed will be along the lines of the Pittman-McReynolds bill—what the Administration wants—giving the White House discretion as to just what articles shall be embargoed.

Realization grows, however, that neutrality is something impossible to guarantee by statute. Withholding of trade in wartime is in itself an unneutral act.

If the U. S. provides for a stoppage of supplies during hostilities, nations in danger of being drawn into conflict will seek to insure sources within their own borders or with countries that will not desert them when most needed. Already the conviction of nations that they must be self-sustaining in nitrogen supply has led to encouragement of plants for its synthetic production to such an extent that, although 1935 consumption reached an all-time peak, plants operated at an average of only 43 per cent. American interest in branch plants abroad is reviving. Thus this country's industry and agriculture would be making a real trade sacrifice to the cause of peace—a futile move that makes it actually easier for certain nations to go to war.

Three steps appear probable in the process of salvaging the aims of the AAA. The House has already appropriated $300,000,000 to pay benefits to farmers contracted for under the defunct law. A second step is an amendment to last year's soil conservation act which would control crops by stretching the term "soil erosion" to include loss of fertility. By broadening this act, federal bonuses are expected to reach 6,000,000 formers, double the number under the late AAA. Benefits under this proposal would be spread over the entire 350,000,000 acres of cultivated land in the U. S.

A third step is the state aid plan under which 48 little AAA's would be set up. State enabling acts would take over the present local central boards, ostensibly sponsored and permitted by the States but paid for and directed from Washington.

Now that the dough boys are assured of theirs, there is some uncertainty as to where the cash will come from. Distribution of $2,100,000,000 to the veterans may give business a fillip, but this outlay together with farm payments must be made over and above a budget that exceeds by $2,375,000,000 any peace time budget ever before laid before Congress. Small wonder that inflation rumors have been received and the dollar weakened in foreign exchange. European experience with inflation is more recent and thorough than ours. Apprehension there as to the stability of the dollar is largely dicounted here because of the prospects of increased federal receipts with greater business activity. But continued demands by pressure groups will give greater weight to foreign viewpoint. Senator Couzens has already stated that next year's $11,500,000,000 Treasury financing will jeopardize the bond market.

Will Fight Bilateral Treaties

A move to test the constitutionality of the Reciprocal Trade Agreement Act was made by J. Carson Adkerson, president of the American Manganese Producers Association, who announced the foundation of the Raw Materials National Council to initiate such action. Careful handling of the two-way pacts plus increased foreign trade has lessened opposition in some quarters against any reduction in duties. Foreign trade authorities pretty well agree that the bilateral treaty approach appears to be the most practical means of moderating trade barriers. However, this policy will always meet with some resistance as exemplified in the present action.

Motors AND OTHER MATTERS

Hard winter gives Detroit a breathing spell . . . G. M. plans "Parade of Progress" . . . Bonus seen as bullish factor . . . Big tooling programs held-up . . . Briggs pushes styled stamped metalware

BURNHAM FINNEY
Western Editor

DETROIT—When the motor car industry decided to introduce its new models in the fall instead of at the year-end, sales executives predicted that November and December would be fattened in volume at the expense of January and February. That is what has happened. Despite all the ballyhoo that the buying habits of the public could be changed overnight, no sensible person in Detroit expected the industry to escape entirely the depressing effects of winter.

It is hard to understand, therefore, why a tremor of fright seems to have run through southern Michigan because car factories have cut down schedules. Obviously it is only a temporary "breathing spell" prior to the big push in the spring. The situation isn't alarming. Dealers and factories did a thumping business in the final two months of 1935. Passenger car sales then amounted to 15.4 per cent of the year's total, compared with 9.6 per cent in the same months of 1934 and 10.2 per cent in 1933. A let-down was inevitable.

Detroit never accepts any adverse developments without an attempt to fight them off. All General Motors divisions except Cadillac-LaSalle now have old car junking programs. Car makers generally are giving buyers of late models of used cars an opportunity to finance them over eighteen months. General Motors is starting its spring shows in Jacksonville, February 1 and will work north, scheduling sixteen during February and twenty-six during March. It also is sending on its way to Florida with a splurge of publicity its "Parade of Progress." This is a traveling caravan, displaying practically all of the corporation's products, which will move from town to town and eventually will make almost every city in the United States.

Car production is down from December and in the next month will be regulated strictly according to retail sales demand. About March 1 the industry will begin to build up dealers' stocks again for the spring trade and there should be four months of high operations from then until July 1. Low-price car companies are bullish about the year's outlook. They feel that their sales will benefit, both directly and indirectly, from the distribution of several billions of dollars by the federal government through the WPA and bonus payments. In addition, they will get their share of business resulting from further industrial recovery. They refuse to be worried over the possibility of curtailment of the farmer's purchasing power, believing that the government will find some legal means of continuing payments this year and that commodity prices anyway will keep up so that crop income will not be impaired.

Equipment buying since January 1 has been in substantial volume and promises to swell to large proportions in the next few months as car manufacturers begin their tooling programs for 1937. Regardless of the fact that the industry generally seems committed to a continuation of conservative designs next year, expenditures will be huge for equipment in connection with changes in materials and with reduction of production costs. Chevrolet, for example, is understood to have placed orders for equipment to machine a new type of light-weight cast alloy iron piston to be used in 1937 cars; some machinery is yet to be bought for this job. Incidentally, the competition among piston materials has reached fever heat. Most companies are committed for the present to aluminum, but Lincoln is using a cast alloy steel developed by the Ford metallurgical laboratories. Chevrolet and Pontiac now are putting cast iron pistons into their cars, the pistons being designed so that lightness of weight is achieved.

A prominent car builder temporarily has held up all orders for machine tools, but has not cancelled them. It is believed that the "go ahead" signal will be given shortly, thus releasing to the machinery trade business valued at several hundred thousand dollars. Seldom have equipment companies had so many inquiries out at one time in the automobile industry. An important machine tool maker, for instance, reports $1,500,000 worth of pending orders. It is reported that all General Motors car divisions have estimated their equipment budgets for 1937, and these now are in the hands of the corporation's high command in New York.

Still Larger Stampings

Despite reports to the contrary, no tooling programs for 1937 have yet got under way. Automotive engineers seem agreed that rear-engine cars are inevitable, but just how long the industry will hold off this innovation on production jobs is another matter. While some builders are going so far as to make plans some day (not next year) to stamp an entire side of a car out of a single steel sheet and weld the two parts together, one company is experimenting with a plastic body with a tubular steel framework.

Automobile companies are spending more money this year than ever before in rust-proofing sheet metal parts. Pontiac, for example, has in operation a spra-bonderizing system which rust-proofs 150 sq. ft. of sheet metal per car at the rate of 9,000 sq. ft. per hr., thereby substantially reducing the bonderizing time. Chevrolet cromodizes sheet metal parts for its current models. So does Hudson.

The motor car industry is in a period of expansion of plant facilities. Chrysler is to use the old Wills-St. Claire plant at Marysville, completely renovated, for manufacture of service parts. General Motors has let contracts for both its Los Angeles assembly plant for Buick, Olds and Pontiac, and for the Grand Rapids Stamping Division. No one would be surprised to see Plymouth add equipment to increase its facilities. General Motors is ready to reopen the Brown-Lipe-Chapin plant at Syracuse, N. Y., unless the labor situation there becomes unfavorable. Seeking as many sources as possible for major parts manufacture within its own ranks, General Motors may further spread out its operations in the next year.

Not so much progress is being made by the car maker investigating the use of a cast crankshaft in place of the present forged shaft. The company is said to be designing a new engine built

around the cast shaft—and adoption of that engine, necessitating large tool purchases, is some time away.

* * *

The fight is on between the old established makers of cast iron plumbing ware and the Briggs Mfg. Co., Detroit, which has recently gone into production of stamped metalware on a big scale. Briggs wired 300 distributors the past week that its prices have been lowered and, at the same time, it is understood that the cast iron people raised their prices. The two lines are now competitive in price, and those on the sidelines are watching to see what place the new stamped plumbing ware can make for itself in the retail market. It appears to have many things in its favor—lightness of weight, ease of installation, availability in any color or combination of colors at no extra cost, and new styles in design.

In the late fall of 1934 a group of manufacturers at Dayton, Ohio, set out to help stabilize employment and incomes of workers by building stock ahead in the slack season. Frigidaire Corp. produced refrigerators and refrigerator parts during November, December and January far in excess of the then current retail demand. Annual sales convention of factory field forces was held about two months ahead of the usual time. Delco built small motors and stored them, and Moraine Products made bearings and other products in anticipation of future sales. Inland Mfg. Co. joined whole-heartedly in the program. All of the companies "stuck their necks out" in a good cause, which worked out satisfactorily. These companies are doing the same thing this winter, the result being that sharp manufacturing peaks have been lopped off, a result well worth the cost.

Detroit Trains Boys

Forty-seven metal-working factories in Detroit have established apprentice training courses and have more than 500 boys enlisted. It is believed that by next fall more than 1,000 boys will be enrolled. This is considered an excellent start in the program to provide Detroit industries with the 3,600 skilled workers annually which it has been estimated are needed to replace those who drop out of the active ranks for various reasons. In a few cases in Detroit and Flint the boys in training are not put in the factory, but are educated in a separate shop well equipped with modern machinery. After they have taken a four-year course, they then are given production jobs. The Chevrolet school at Flint, established five years ago, already has graduated 48 boys of whom three are now foremen.

R. R. Teetor Takes Office At S. A. E.'s Largest Meeting

DETROIT — The biggest and busiest annual meeting, in the history of the Society of Automotive Engineers was held at the Book Cadillac Hotel, Detroit, January 13-17. A program which covered every phase of automotive engineering from production to safe operation, from thermodynamics to lubrication, and from aircraft to diesels, found response in over 2,000 members and visitors who attended. New officers, given in the accompanying list, were inducted into office.

Of particular interest to production executives were the papers given by J. C. Fox, Doehler Die Casting Co., on "The Place of Die Castings in Automotive Design"; by V. P. Rumely, Hudson Motor Car Co., on "Custom Building Production Cars"; and by R. B. Schenck, Buick Motor Co., on "Metallurgy of Transmission Gears."

Now Heads S.A.E.

RALPH R. TEETOR

Mr. Fox's paper made a critical analysis of the increasing use of die castings in present day automobiles and of the physical properties of the various types of die cast materials. He traced the acceptance of the zinc die cast radiator grilles by specific makes of cars; in addition, he described such properties as corrosion resistance, finishing and strength of zinc base, aluminum base, copper and magnesium base alloy die castings.

The Hudson method of scheduling and routing parts so as to assemble custom body jobs on the regular production line was given by Mr. Rumely. This system enables the handling of a wide variety of options as to body, color, upholstery and other specifications without disrupting the flow of

Retiring President

WILLIAM B. STOUT

New S.A.E. Officers

PRESIDENT
Ralph R. Teetor,
Chief Engineer, Perfect Circle Co.

VICE-PRESIDENTS
AIRCRAFT ENGINEERING
Opie Chenoworth,
U. S. Army Air Corps
DIESEL ENGINEERING
F. M. Young,
President, Young Radiator Co.
FUELS AND LUBRICATION
T. B. Rendel,
Shell Petroleum Corporation
PASSENGER CAR ENGINEERING
E. H. Smith,
Development Engineer, Packard Motor Car Co.
PASSENGER CAR BODIES
R. J. Waterbury,
Body Engineer, Chevrolet Motor Co.
PRODUCTION
Karl L. Herrmann,
Bantam Ball Bearing Co.
TRACTORS AND INDUSTRIAL POWER
A. W. Lavers,
Chief Engineer, Minneapolis Moline Power Implement Co.
TRANSPORTATION AND MAINTENANCE
H. W. Drake,
A. F. Blangy Motor Co.
TRUCK, BUS AND RAIL CAR
Adolph Geitke,
Assistant Chief Engineer, Autocar Co.

COUNSELORS
Joseph A. Anglada,
President, Anglada Motor Co.
Louis Schwitzer,
President, Schwitzer Cummins Co.
Alex Taub,
Development Engineer, Chevrolet Motor Co.
F. B. Horner,
Ass't. to Vice-President, General Motors Corp.
H. C. Wilson,
Chief Engineer, Chrysler Corporation
Austin M. Wolf,
Consulting Engineer

TREASURER
David Beecroft,
Bendix Aviation Corporation

Presented at S.A.E. Meeting

DANIEL GUGGENHEIM MEDAL
Dr. William F. Durand,
Professor Emeritus, Stanford University

WRIGHT MEDAL
William Littlewood,
Chief Engineer, American Airlines

MANLY MEDAL
Guy E. Beardsley, Jr.,
Project Engineer, Pratt & Whitney Aircraft Co.

VINCENT BENDIX TROPHIES
Gold—Ben. O. Howard
Silver—Roscoe Turner
Bronze—Russell Thaw

cars to the shipping docks. Mr. Schenck gave detailed information regarding the metallurgy and heat-treatment of transmission gears, including forging, annealing and hardening.

Great interest was shown in a paper by Austin M. Wolf who projected himself into the future in order to look back at the mistakes in the cars of today. Another critical paper was presented by Herbert Chase who called attention to some of the defects in present-day design.

The meeting closed with a session held jointly with the American Welding Society. "Physical Chemistry of Arc Welding," by F. R. Heusel, and "Fundamentals of Spot Welding," by E. I. Larsen, were presented. Both authors are associated with P. R. Mallory & Co. A complete program of the S.A.E. sessions appeared previously on these pages (*AM*—Vol. 79, page 924g).

Index of Orders Based on Volume of Shipments for 1926

	Index of Orders			No. of Reports	% Foreign to Total Orders
	Domestic	Foreign	Total		
1934 average	36.7	9.5	46.2	167	20
1935 average	64.9	21.1	86.0	155	24

Index of Orders—By Size of Companies

	Index of Orders			No. of Reports	% Foreign to Total Orders
	Domestic	Foreign	Total		
Group A—Companies reporting year's sales in 1926 of $200,000 or more:					
1935 average	64.4	22.0	86.4	89	25
Group B—Companies reporting year's sales in 1926 of less than $200,000:					
1935 average	77.4	8.6	86.0	66	10

Distribution of Orders

Average Indexes of Individual Companies	Per Cent of Total Reporting in 1935			
	1st quarter	2nd quarter	3rd quarter	4th quarter
100 or more	16.7	21.6	36.3	35.6
60-99	16.9	22.0	17.2	21.7
20-59	39.6	31.2	31.6	27.7
Less than 20	26.8	25.2	14.9	15.0
	Group Index of Orders			
Group A	60.6	77.5	108.5	98.9
Group B	55.6	63.8	108.6	116.3
	Percentage of Orders for Foreign Delivery			
Group A	22.1	19.1	35.3	20.1
Group B	7.1	9.6	12.4	9.6

Industrial Review

• ALMOST WITHOUT exception machinery and machine tool distributors in the industrial centers of the country report an upward trend in sales during January. Salesmen are finding customers more ready to consider cost reducing machinery replacements, and old inquiries are coming to life. A small increase in lathe prices is announced for February 1. Inability to find qualified men for certain jobs is stimulating interest in trade training.

• BUSINESS CONTINUES to show improvement in the New England territory. Salesmen say that customers are evincing considerable optimism. New York business slowed down somewhat during the first half of January but has improved strongly during the last part of the month to make the total quite a satisfactory one. Philadelphia also reports a continuation of the upswing in sales. There is a steady placing of orders for units of medium size. Interest of executives in modernization is encouraging Pittsburgh distributors to look for a very profitable year. Immediate sales are not large in volume but continue to exhibit pleasing regularity.

• JANUARY WAS an excellent month in the Cleveland territory, several companies reporting business in excess of the satisfactory December volume. Detroit is not particularly concerned about labor trouble at the moment. The automobile manufacturers have not been ordering very much in the way of equipment. Employment has been down a little but both employment and machinery sales are expected to improve considerably within the next two or three weeks. Toledo reports that conditions are still favorable there with no strikes and production schedules well maintained. Inquiries are good. In Cincinnati inquiries have tapered off somewhat but business has been very fair nevertheless. There seems to be no immediate danger of labor trouble.

• DISTRIBUTORS IN St. Louis continue to be optimistic with deferred deliveries one of their worst problems. January has opened with an encouraging amount of business. During the first ten days of the month Chicago business lagged somewhat but has been making up for lost time since. The Santa Fe inquiries for drills and grinders for various shops were the first railroad business to come out in some time. Everything is quiet on the labor front both around Chicago and also in the Milwaukee vicinity. Inquiries continue good in both places and prospects for a good year are brighter than ever.

1935 Machine Tool Orders Show 86 Per Cent Rise

For 1935, the index of machine tool orders as compiled by the National Machine Tool Builders' Association, averaged 86.0 as compared with 46.2 for 1934, an increase of 86 per cent. Last year's showing is about 24 per cent above the fifteen year average (1920-1934). Foreign sales amounted to 24 per cent of the total and formed a 124 per cent increase for 1935.

The number of companies reporting business of 100 per cent or better (based on 1926 shipments) more than doubled during the year, while those showing less than 20 per cent of the 1926 level gradually diminished.

At the end of the year Groups A and B, representing large and small concerns respectively, had almost the same index. As the year progressed, however, the smaller companies, which started out with comparatively lower sales, made greater progress than the larger ones.

April Date Set For Gear Meeting

Monday and Tuesday, April 20 and 21, have been the dates selected by the American Gear Manufacturers Association for its twentieth annual convention according to A. A. Ross, president. The session will be held at the Adelphia Hotel, Philadelphia, Pa.

Russell L. Ball, Philadelphia Gear Works Inc., is chairman of the convention committee; B. F. Waterman, Brown & Sharpe Mfg. Co. is chairman of the program committee.

Washington Award Goes To Charles F. Kettering

Charles F. Kettering, vice-president in charge of research, General Motors Corporation, has been selected to receive the Washington award for 1936 by a commission representing the American Society of Civil Engineers, American Institute of Mining and Metallurgical Engineers, American Society of Mechanical Engineers, American Institute of Electrical Engineers and Western Society of Engineers. The award is given annually when deserving candidates are found as "an honor conferred upon a brother engineer by his fellow engineers on account of accomplishments which preeminently promote the happiness, comfort and well-being of humanity."

Formal presentation will be made to Mr. Kettering at a dinner to be held in Chicago on February 27. Last year the recipient was Ambrose Swasey.

C. C. Carlton Continues As Parts Group President

C. C. CARLTON, secretary of Motor Wheel Corp., has been reelected president of the Automotive Parts and Equipment Manufacturers, Inc., Detroit. BEN F. HOPKINS, president of the Cleveland Graphite Bronze Co., will serve as vice-president, M. C. DEWITT, vice-president of the Champion Spark Plug Co., as secretary, and D. W. RODGER, vice-president of Federal-Mogul Corp., as treasurer.

Used Machinery Dealers Retain Present Officers

At its annual meeting, held at the William Penn Hotel in Pittsburgh, January 18, the National Association of Used Machinery & Equipment Dealers voted to continue the present officers and directors. J. E. Middleton, of L. F. Seyfert's Sons, Inc., was appointed acting secretary. Amendments were adopted providing for individual instead of the former group membership and changing the annual meeting to September of each year.

U. S. Chief Supplier of Japanese Farm Tools

Approximately 75 per cent of the mechanic's tools and agricultural implements imported into Japan are supplied by the United States, according to a report to the Commerce Department from its Tokyo office. For the first ten months of 1935, total Japanese imports in these groups were valued at 3,096,914 yen compared with 2,104,873 yen for the corresponding period of the preceding year. During 1934, Japan bought, in this country, mechanic's tools and agricultural equipment valued at 763,733 yen. Germany, Sweden and Great Britain are other sources of these items.

It is impossible to determine accurately Japanese production of agricultural implements as the greater part of the output is manufactured by hand by artisans in all parts of the country. Because of conditions prevailing in connection with Japanese agriculture, Japan does not offer a promising market for American manufacturers.

Prague Fair to Be Held Next March

Immediately following the Leipzig Spring Fair, the International Fair at Prague, Czechoslovakia, will be held this year on March 6-15. Because of the revival of this country's export trade, over 3,000 exhibitors are expected from many countries.

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Dr. A. A. Potter Elected Engineering Council Head

At the 16th annual meeting of the American Engineering Council, held in Washington, January 10 and 11, Dr. A. A. Potter, dean of the schools of engineering, Purdue University, was elected president for 1936 and 1937. Ralph E. Flanders, president of the Jones & Lamson Machine Co., is vice-president for a two-year term, and J. S. Dobbs, professor of civil engineering, Iowa State College, for one year. Other members of the executive committee and Frederick M. Feiker, executive secretary, were re-elected.

The meeting was opened by retiring President J. F. Coleman who spoke on the elements needed to revive the construction industry. A survey of the engineering profession was discussed by George T. Seabury, chairman of the Council's Engineering and Allied Technical Committee, and by Dr. Isador Lubin, commissioner of labor statistics, whose Bureau is conducting the study. Mr. Flanders presented the third progress report of the committee on the inter-relation of production distribution and production which was referred for study to local delegates and is to be reported back February 1.

Council's President

DR. A. A. POTTER

The All Engineers Dinner, held at the Mayflower Hotel, January 10, was attended by 450 engineers and was addressed by Dr. William F. Durand, chairman of the Third World Power Conference, and other eminent engineers.

Resolutions adopted at the meeting contemplate improved technical standards in the aviation industry. As the results of the work of its aeronautic sub-committee, the Council's Committee on Public Relations adopted a report supporting aeronautical research by the colleges, further studies toward a simplification of aircraft construction regulations, placement of employees of the Bureau of Air Commerce under Civil Service, and disfavoring further investigations of the industry.

Dean Potter, chairman of the Committee on Patents, presented a report dealing with the elimination of fraudulent practices, the use of a single signature on patent applications, the validation of joint patents, and the extension of the full rights of inventors.

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Foundrymen's Association Organizes Safety Section

To make more effective the work of the American Foundrymen's Association as carried on for a number of years for the protection of foundry workers, a safety and hygiene section has been organized. E. O. Jones for many years associated with the Bell City Malleable Iron and Racine Steel Casting Co., and for the past three years consultant of Industrial Relations Bureau of the National Founders Association, has been made director of the newly formed section. His headquarters will be at the A.F.A. offices, 222 West Adams Street, Chicago, Ill.

50 Years With Norton

CHARLES L. ALLEN

Half-Century Mark Passed by Norton Co.

Last month the Norton Co. of Worcester, Mass., makers of grinding machines and abrasives, celebrated the 50th anniversary of its founding. The only man who had a hand in the management of the company during its entire life is Charles L. Allen, who was made general manager at the time of its founding. This position he held for 48 years and at various times has been secretary, treasurer and president. He was elected chairman of the board in 1933 and holds that position today. A special 57-page issue of the company's publication, the "Norton Spirit" commemorates the anniversary.

J. L. Wick, Jr. Named To Head Foundrymen

Meeting in Cleveland on January 13, the nominating committee of the American Foundrymen's Association selected James L. Wick, Jr., president and general manager Falcon Bronze Co., to head the Association's slate of officers for 1936-37. Mr. Wick is at present vice-president of the Association and has been chairman of the A.F.A. cost committee for many years. Other nominees named by the committee are as follows:

Vice-president—H. Bornstein, chief chemist and metallurgist, Deere & Co.

For directors to serve for three years—

Marshall Post, vice-president, Birdsboro Steel Foundry & Machine Co.

L. N. Shannon, vice-president and production manager, Stockham Pipe & Fittings Co.

James R. Allan, assistant manager, Industrial Engineering & Construction Dept., International Harvester Co.

C. C. Gibbs, president, National Malleable & Steel Castings Co.

Dan M. Avey, editor, *The Foundry*.

Conference Board Finds Wage Level Maintained

Contrary to some of the gloomy predictions made when the National Industrial Recovery Act was invalidated last May by Supreme Court decision, there has been no widespread tendency to cut wages, to increase hours of work, or to lay off employees, according to a study of these matters by the National Industrial Conference Board. Payroll records of about 2,000 manufacturing plants in 25 industries, which employ more than 1,000,000 workers, show that hourly earnings and employment in October, 1935, were above those of April, the last month under NRA, and that the average working week was less than two hours longer. Much of the increase in hours reflects better business conditions, and in many industries the work week was still below that set by the code.

In 17 of the 25 industries, average hourly earnings were higher in October than in April; in seven industries they were less, and in one industry they were the same. Among the seven industries in only one was the decline more than one cent.

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Illinois Society Reaches 50th Year

At its 51st annual meeting, to be held at Urbana, Ill., January 30, 31 and February 1, the Illinois Society of Engineers will celebrate its 50th birthday. This organization, one of the nation's leaders in its field, was founded by two early University of Illinois faculty members, Professor A. N. Talbot, who although retired is active in research investigations on the campus almost every day, and Professor Ira O. Baker, now deceased.

The membership today totals 385, of whom approximately 300 are expected to attend the meeting. A plaque will be presented to the university.

De Vilbiss Announces Spray Painting Course

Training periods of one week on the technique of spray painting are available to industrial painters, master painters, automobile refinishers and others at the De Vilbiss school in Toledo. Classes start February 10, March 9, April 6, May 4 and June 8.

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EXPORT OPPORTUNITIES

Cotton ginning machinery (Agency). Santiago, Chile. *9973.

Cranes, wharf (Agency), Lourenco Marques, Portuguese East Africa. *9971.

Cube root drying and grinding machinery (Purchase). Lima, Peru. *9975.

Dextrin manufacturing machinery (Purchase). Maisons-Alfort, France. *9979.

Egg-carton-filler manufacturing machinery, rotary type (Purchase). Capetown, South Africa. *9976.

Die-casting machines and other machinery and engineering accessories (Agency). London, England. *9968.

Metal lathe, belt driven, with or without countershaft (Purchase). The Hague, Netherlands. *9977.

Winding machine for making transformer coils for radio sets (Purchase). Kaunas, Lithuania. *9974.

Chain making machinery (Purchase). Johannesburg, South Africa. *9978.

Confectionery manufacturing machinery (Purchase). Merida, Mexico. *9972.

Air-conditioning machinery (Agency). Columbo, Ceylon. *46.

Bag-cutting machines and printing machines (Agency). Durban, South Africa. *59.

Carbon black pressing and packing machines (Purchase). Moravska Ostrava, Czechoslovakia. *57.

Cartridge leads and lead wire making machinery (Purchase). Wavre, Belgium. *56.

Dry-ice manufacturing equipment (Purchase). Rotterdam, Netherlands. *69.

Diesel engines (Purchase and agency). Johannesburg, South Africa. *58.

Ice-cream manufacturing machinery and equipment (Purchase). Liverpool, England. *82.

Lead seal making machines (Purchase). Brussels, Belgium. *55.

Match making machinery (Purchase). Paris, France. *53.

Pumps, turbine, deep well (Purchase). Paris, France. *54.

Pyroxylin tooth brush making machinery, automatic (Purchase and agency). Prague, Czechoslovakia. *42.

Refrigerating compressors (Purchase and agency). Prague, Czechoslovakia. *79.

Tire-valve manufacturing machinery (Purchase). Barcelona, Spain. *83.

*Interested American firms and individuals may obtain the names and addresses of the foreign firms making these inquiries upon application to the Bureau of Foreign and Domestic Commerce, U. S. Department of Commerce, Washington, or any district or cooperative office.

1936 Metal Congress To Be at Cleveland

Cleveland's Public Auditorium will house the National Metal Congress and Exposition, to be staged next October 19-23. The Congress is sponsored annually by the American Society for Metals, with the American Welding Society, the Wire Association, Institute of Metals and Iron and Steel divisions of the American Institute of Mining and Metallurgical Engineers cooperating.

At the Exposition held in Chicago last fall 200 exhibitors used 175,000 sq.ft. of floor space to show their products.

PERSONALS

GLEN J. BUNDY has been appointed vice-president and general manager of the Owen Dyneto Corp., Syracuse, N. Y., a subsidiary of the Electric Auto-Lite Co., Toledo. He has been a member of the parent company's sales engineering staff for several years and was formerly production manager of the USL Battery Corp., another Auto-Lite subsidiary. Mr. Bundy succeeds HARRY L. BILL who resigned to join the Bendix Aviation Corp.

ALBERT F. SULZER, until recently general manager of Kodak Park Works of Eastman Kodak Co., has been made assistant to the general manager of the company. CHARLES K. FLINT, assistant to Mr. Sulzer has been promoted to general manager of the Kodak Park Works.

E. G. MARSHALL, formerly chief tool designer, Remington-Rand, Norwood, Cincinnati, has become master mechanic at the Kelly Axe and Tool Works, Charleston, W. Va., a division of the American Fork & Hoe Co.

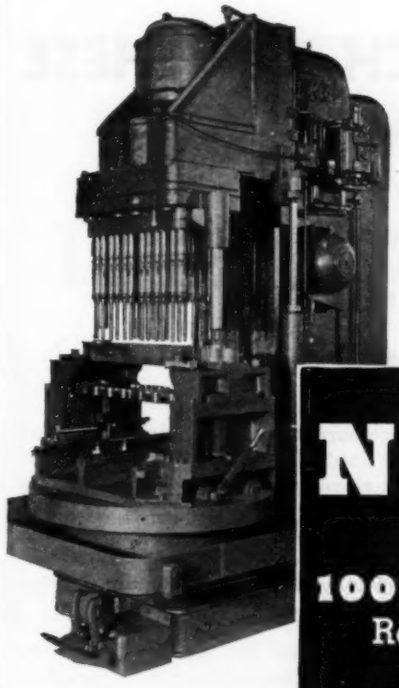
M. L. ECKMAN has returned to the engineering department of the Federal Machine & Welder Co., Warren, Ohio. The time spent away from the Federal company, Mr. Eckman used to conduct experimental engineering work with the Thompson-Gibb Electric Welding Co., Lynn, Mass.

R. C. BROWER, secretary-treasurer, Timken Roller Bearing Co., has been elected director of the company to fill the vacancy created by the death of J. G. OBERMIER. Mr. Brower has been identified with the Timken organization since 1916.

CLYDE W. BLAKESLEE, N. A. Strand & Co., has been elected president of the Machinery Club of Chicago. A. W. SMITH, L. S. Starrett Co., was elected at the same time as additional member of the board.

OBITUARIES

COL. M. C. RORTY, engineer-economist, former vice-president of the International Telephone and Telegraph Corp., and since 1934, president of the American Management Association, died January 18. Col. Rorty was a graduate of Cornell University. He was first identified with J. G. White Co., New York Telephone Co., and American Bell Telephone Co., which he left in 1903 to become general superintendent of traffic with the Central District Telephone Co., Pittsburgh. For many years he was associated with American Telephone and Telegraph Co., and was assistant vice-president of Western Union Telegraph Co., from 1913-1914. In turn he became vice-president of the Bell Telephone Securities Co., and the American Telephone and Telegraph Co., and president of the International Telephone Securities Corp. From 1930 to 1931 he was vice-president of the American Founders Corp.



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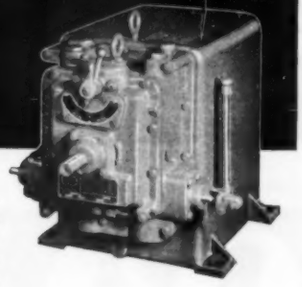

NEWS! News for machinery designers, sellers and buyers! The new Oilgear Fluid Power Feeds bring new speed, new smoothness, and new low cost. You should have the facts. Get them, in Oilgear's big new book. The OILGEAR Company, 1309 W. Bruce St., Milwaukee, Wisconsin.

Shown here: New Oilgear Fluid Power Feed. Note flanged mounting, as integral machine part... Inside pump, eliminating hazard and improving appearance... Self-contained; auxiliary valves and tubing are integral with pump... Many other exclusive features.

OILGEAR FLUID POWER FEEDS

Col. Rorty was particularly well known as an economist and was the author of several books on economic subjects.

ALBERT F. SHORE, president, The Shore Instrument & Mfg. Co., Jamaica, N. Y., died January 17. Mr. Shore was the inventor of the scleroscope, an instrument for measuring the hardness of metals, in 1907. He was awarded the Elliot-Cresson Medal from the Franklin Institute. Mr. Shore was 59 years old.

Erick S. Ekstrom, president of the Mechanics Universal Joint Co., Rockford, Ill., died January 12. Mr. Ekstrom started in the company as a book-keeper and through succeeding positions achieved the presidency. He was also a director of the Sundstrand Machine Tool Co.

GEORGE ENGEL, for the past fifteen years managing director of the German Association of Machine Tool Builders, and a well known engineer, died of a complication of diseases on December 22, 1935, in Berlin. He was 61 years old. Probably few of those who met him at the Machine Tool Show in Cleveland last September realized how seriously ill he was. His unfailing cheerfulness and wit concealed the evidences of the disease that was destroying him.

Editor Emeritus Dies

FRED R. LOW

Fred R. Low Dies, Former Editor of Power

Fred R. Low, editor emeritus of *Power*, died on January 22 at his home in Passaic, N. J. He was 75 years old.

A self-made man whose formal schooling stopped at the age of 14, Mr. Low achieved wide recognition as an engineer and technical editor. For 42 years (1888-1930), he was chief editor of *Power*. He was a past president of the American Society of Mechanical Engineers, former mayor of Passaic, honorary member of the British Institution of Mechanical Engineers and honorary doctor of engineering, Rensselaer Polytechnic Institute. He was also a member of the National Association of Power Engineers. Mr. Low was also author of four technical books in the power field.

WALTER GRIBBEN, who began contributing to the columns of the *American Machinist* over 40 years ago, died January 11. An excellent mechanic, he specialized in experimental and repair work of the highest grade. Working alone in a small shop, equipped with high grade machines and many attachments of his own design and make, he made an enviable reputation for high class work.

WHICH OF THESE FIVE different operations interest YOU most?

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BUSINESS ITEMS

The Torrington Co., Torrington, Conn., and its subsidiary, The Bantam Ball Bearing Co., South Bend, Ind., have appointed A. S. HELLSTROM as manager of the Cleveland, Youngstown, Akron and Wheeling districts with offices in the Claxton Bldg., Cleveland, Ohio. Mr. Hellstrom joined the Bantam organization in January 1934.

The Mechanical Specialties Mfg. Co., Chicago, has changed its name to Gear Specialties, Inc., a name more accurately describing the activities of that organization.

The Quickwork Co., formerly located at St. Marys, Ohio, have moved to their new plant at 900 N. Spaulding Ave., Chicago, Ill. The additional products they are turning out include welded steel press frames, welded steel columns for power hammers and other welded rolled steel assemblies.

FRANK J. LUNNEY, formerly with J. N. Moyer, Philadelphia used machinery dealer, has gone into business selling used presses, shears, brakes, welders and sheet metal tools, at 953 N. Front St., Philadelphia.

Detroit Rex Products Co., is opening a new branch office at 201 N. Wells St., Chicago, Ill., to cover the states of Wisconsin, Illinois and Missouri. The representatives in charge of this territory are C. P. ANSTISS, S. B. CROOKS and C. L. JUNG.

The Bakelite Corp., Bound Brook, N. J., and The Black & Decker Mfg. Co., Towson, Md., have become members of the Exhibitors Advisory Council, Inc., 330 West 42nd St., New York.

Harnischfeger Corp., announces the appointment of R. L. MEAD as manager of their Chicago office, 20 North Wacker Drive. Prior to his connection with Harnischfeger, Mr. Mead was connected with the Industrial Brownhoist Co., and most recently with the Link Belt Co., as district sales manager.

Colt's Patent Fire Arms Mfg. Co., has promoted L. H. MCCLURE to sales manager. Mr. McClure has been identified with this company since 1918. He is a graduate of Trinity College from where he went directly to his first position with the Hartford Electric Light Co.

The Owens-Illinois Glass Co., Toledo, Ohio, has completed the world's first all-glass, windowless structure which is to be occupied February 1, by the company's packaging research division. The two-story building required the use of 80,000 glass blocks in its exterior walls and interior partitions. It consists of 39 rooms with a total of over 20,000 sq.ft. of floor space. The translucent (but not transparent) building blocks are a product of the company.

Grand Rapids Stamping Division of General Motors Corp., Grand Rapids, Mich., has let contract to J. A. Utley, Detroit, for erection of new stamping and die manufacturing plant.

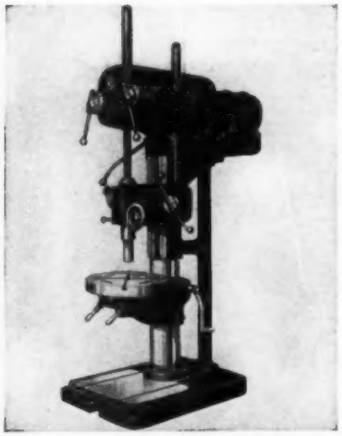
Evans-Walton Co., 243 West Congress St., Detroit, Mich., has been organized to manufacture and sell products developed by E. S. Evans & Sons. Products include the Evans "Bat-Recharger", Evans wiper blade refill and touch-up tape.

Chrysler Corp. will begin shortly operation of the old Wills-St. Clair automobile plant, Marysville, Mich., as a service parts manufacturing plant. An addition 50x300 is planned.

Argonaut Manufacturing Division of General Motors Corp., Los Angeles, Calif., has let contracts for construction of a new assembly plant at Alameda St. and Tweedy Road. The factory building will be 560x800 ft. Plant will have initial capacity of 40,000 to 50,000 cars a year.

CLEEREMAN
DRILLING MACHINES

Fully geared, anti-friction, automatically oiled, sliding and stationary heads.



Round Column, Sliding Head Drill. Also built in square column type.

Cleereman drills are ruggedly built for heavy duty work with the latest types of high speed tools. On the sliding head machines the speed and feed mechanisms are of an improved original design with single lever control for each unit. These levers are conveniently located at the front of the machine within easy reach of the operator. Single levers also clamp the sliding head and the table.

The feed and speed boxes are each complete units, with all parts readily accessible. Gears are heat treated chrome molybdenum steel and shafts are chrome nickel steel. Spiral type bevel gears used in the spindle drive give a constant, easy, smooth flow of power to drill or boring tools.

Cleereman drills are the product of more than 21 years of experience in the design and building of drilling machinery. They have many exclusive features. Let us send you complete information. Ask for Bulletin 110.

Fully Geared Stationary Head Drills in round or square column types.

OTHER CLEEREMAN DRILLING MACHINES

The Cleereman line of drilling machinery includes "Rockford" mechanics drills, Gang drills; special drilling machinery to meet specific requirements.

THE CLEEREMAN MACHINE TOOL CO.
GREEN BAY, WISC.

PATENTS

January 7, 1936

Metal-Working Machinery

Machine for Testing Accuracy of Gears. Gustof L. Hansen, Detroit, Mich., assigned to National Broach & Machine Co. Patent 2,026,784.

Corrugating Machine. Louis H. Brinkman, Glen Ridge Borough, N. J. Patent 2,027,018.

Multiple Spindle Boring Machine. James Coulter, Bridgeport, Conn. Patent 2,027,023.

Balanced Driving Head for Machines. Forrest F. Johnson, Spencer, Ohio, assigned to the Spencer Manufacturing Co. Patent 2,027,174.

Tools and Attachments

File and Method of Making the Same. Paul E. Heller, Newark, N. J. Patent 2,027,039.

Curved Tooth File. Paul Elias Heller, Newark, N. J. Patent 2,027,040.

January 14, 1936

Metal-Working Machinery

Broaching Machine. Julian L. Perkins and Hiram D. Croft, Springfield, Mass., assigned to Perkins Machine & Gear Co. Patent 2,027,401.

Forging Means. George Spatta, Buchanan, Mich., assigned to Clark Equipment Co. Patent 2,027,406.

Lathe. Wendell E. Whipp and Clifford A. Bickel, Sidney, Ohio, assigned to the Monarch Machine Tool Co. Patent 2,027,568.

Grinding Machine. Harold L. Blood and Alfred P. Burns, Worcester, Mass., assigned to the Heald Machine Co. Patent 2,027,627.

Double Dial Control for Hydraulic Radial Drills. Lawrence L. Schauer, Wyoming, and John H. McKewen, Cincinnati, Ohio, assigned to Cincinnati Bickford Tool Co. Patent 2,027,705.

Counterbalance Valve. Lawrence L. Schauer, Wyoming, and John H. McKewen, Cincinnati, Ohio, assigned to Cincinnati Bickford Tool Co. Patent 2,027,706.

Milling Machine. Henry O. Fletcher, Manchester, N. H. Patent 2,027,726.

Press. William Klocke, Woodhaven, N. Y. Patent 2,027,735.

Supplementary Tool Support for Turret Lathes. Myron S. Curtis, Pawtucket, R. I., assigned to William Wallace Potter. Patent 2,027,901.

Processes

Method of Making Wrist Pins. Frank H. Banner, deceased, late of Rochester, N. Y., assigned to General Railway Signal Co. Patent 2,027,573.

Method and Machine for Producing Hob Cutters. Heinrich Schicht, Huckeswagen, Germany, assigned to W. Ferd. Klingelnberg Sohns. Patent 2,027,621.

January 21, 1936

Metal-Working Machinery

Mechanism for Mechanical Measurements. John T. Brubaker, Wilkinsburg, Pa. Patent 2,028,134.

Die Casting Machine. George K. Cherry, Western Springs, Ill., assigned to Western Electric Co., Inc. Patent 2,028,192.

Automatic Lathe. Karl Tessky, Esslingen, Germany. Patent 2,028,362.

Method and Apparatus for Cutting Metals. Noah E. Wagner, Tulsa, Okla., assigned to the Linde Air Products Co. Patent 2,028,425.

Spindle Bearing. Harry Hales Asbridge, Ashton-on-Mersey, England, assigned to the Churchill Machine Tool Co., Ltd. Patent 2,028,487.

Grinding Machine. William Arter and Harry Arter, Worcester, Mass., assigned to Arter Grinding Machine Co. Patent 2,028,642.

Construction of Machine Tools. Raymond S. Perry, John R. Johnson and Alexander Oberhoffken, Rockford, Ill., assigned to the Ingersoll Milling Machine Co. Patent 2,028,727.

Tools and Attachments

Undercutting Attachment for Lathes. John J. O'Brien and Miles W. OBrien, South Bend, Ind. Patent 2,028,293.

Die. Albert E. Carliss, Floral Park, N. Y., assigned to Acme Air Appliance Co., Inc. Patent 2,028,437.

Art of Forming Dies. Albert Edward Carliss, Floral Park, N. Y., assigned to Acme Air Appliance Co. Patent 2,028,438.

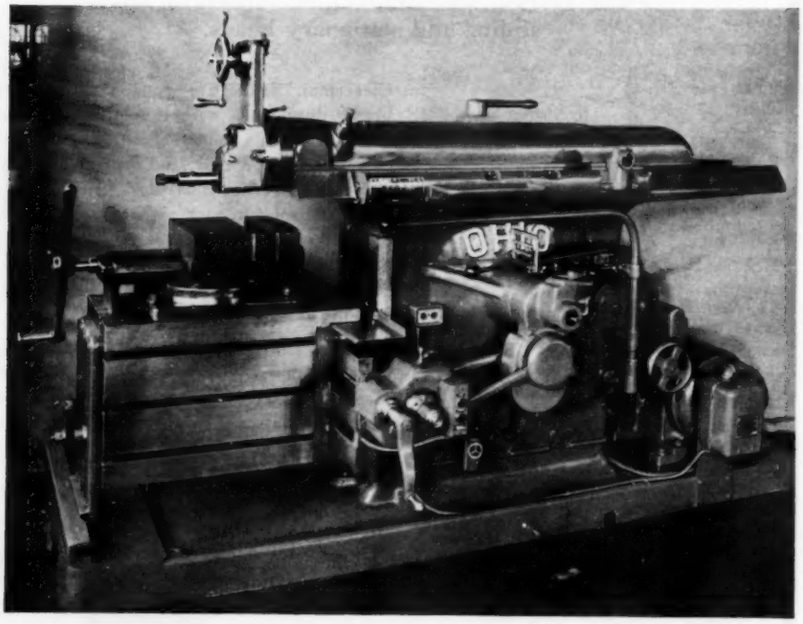
Honing Tool. Kirke W. Connor and Albert Bleasdale, Detroit, Mich., assigned to Micromatic Hone Corp. Patent 2,028,648.

Processes

Grinding of Rotating Eccentric Knives. Walter Everett Molins, deceased, late of Deptford, London, England. Patent 2,028,681.

"OHIO" SHAPERS

DREADNAUGHT
UNIVERSAL
RAPID TRAVERSE



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MEETINGS

AMERICAN MANAGEMENT ASSOCIATION. Conference on personnel and industrial relations, Feb. 5-7. Palmer House, Chicago, Association headquarters, 20 Vesey St., New York.

AMERICAN SOCIETY FOR TESTING MATERIALS. 1936 regional meeting, Hotel William Penn, Pittsburgh, Pa. Symposium on high-strength constructional metals. B. L. WARWICK, secretary-treasurer, 260 So. Broad St., Philadelphia, Pa.

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION. Annual meeting, Feb. 8. Cleveland Hotel, Cleveland, Ohio. ARTHUR J. TUSCANY, executive secretary, Cleveland, Ohio.

NATIONAL OIL BURNER SHOW. April 14-18. Convention Hall, Detroit. G. HARVEY PORTER, managing director, Oil Burner Institute, Inc., 30 Rockefeller Plaza, New York, N. Y.

PACKAGING EXPOSITION. Hotel Pennsylvania, New York, N. Y., March 3-6. American Management Association, 232 Madison Ave., New York, N. Y.